



Batty Langley Invent



Principles
Batty Langley Invent

T H E
BUILDER'S JEWEL:
O R, T H E
YOUTH'S INSTRUCTOR,
A N D
WORKMAN'S REMEMBRANCER.
E X P L A I N I N G
SHORT and EASY RULES.

Made familiar to the meanest Capacity,

For **DRAWING and WORKING,**

I. The FIVE ORDERS of Columns entire: or any Part of an Order, without Regard to the Module or Diameter.

And to enrich them

With their Rusticks, Flutings, Cablings, Dentules, Modillions, &c.

Also to proportion

Their Doors, Windows, Intercolumnations, Portico's, and Arcades.

TOGETHER WITH

Fourteen Varieties of Raking, Circular, Scrolled, Compound, and Contracted Pediments; and the true Formation and Accadering of their Raking and Returned Cornices; and Mouldings for Capping their Dentules and Modillions.

II. Block and Cantaliver Cornices, Rustick Quoins, Cornices proportioned to Rooms, Angle Brackets, Mouldings for Tabernacle Frames, Pannelling, and Centering for Groins, Trussed Partitions, Girders, Roofs and Domes. With a Section of the Dome of St. P A U L's, L O N D O N.

The Whole illustrated by upwards of 200 Examples, engraved on 100 Copper-plates.

By B. and T. L A N G L E Y.

The T W E L F T H E D I T I O N.

D U B L I N:

Printed for JAMES WILLIAMS in Skinner-Row. 1768.

(Price 5 s. 5 d.)

65. h. 105. 2nd



INTRODUCTION.

NOTWITHSTANDING there are many Volumes already extant on the Subject of Architecture; yet, as not one of them is made a fit size for the Pocket; and it being an Impossibility for the general Part of Workmen to retain and carry in their Minds all the useful Rules and Proportions, by which Works in general are performed: I have therefore, at the Request of many good Workmen, and for the Sake of young Students, compiled this Work; wherein I have reduced the whole to such short and easy Rules, that the Workman may not only at the first View renew his Memory, as Occasions may require, but Apprentices, who may be absolutely unacquainted with this noble Art, and are so unfortunate as many have been, and are, to be bound to Jobbing Masters, who know but little; may without the Help of any, by assiduous Application at their leisure Hours, in Evenings when the Business of Days is over, &c. make themselves such Masters herein, that few Masters are able or willing to make them. And indeed I must own, that 'tis a Pleasure to me, to see the Spirit of Emulation so powerful among young Builders at this Time; when every one of Sense is endeavouring to become the most excellent in his Way, and thereby make himself the most useful both to himself and his Country.

It is useful Knowledge only that makes one Man more valuable than another, and especially that Part of Knowledge, which immediately concerns the Business he is to live by; and therefore, if this Work should prove a Help to the Improvement of Knowledge in Youth, (for whose Sakes 'tis chiefly intended,) and be no Affront to the *sage Workman*, by re-informing him of those Rules which have slippt his Memory, and informing him of others which he never knew, it will answer the desired End of their hearty Well-wisher,

London, Nov. 2, 1746.

THO. LANGLEY.

A 2

CHAP,

1940

1746

194

4 *The* B U I L D E R ' s J E W E L .

CHAP. I. *Of the Orders in general, and of their principal Parts.*

THE Orders in general are the *Tuscan*, *Dorick*, *Ionick*, *Corinthian*, and *Composite*.

THEIR principal Parts are their Pedestals, Columns, and Entablatures.

THE Height of the Pedestal in every Order is always one fifth of the whole Height of the entire Order.

THE Height of the *Tuscan* Column is 7 Diameters, the *Dorick* 8, the *Ionick* 9, and the *Corinthian* and *Composite* each 10 Diameters.

THE *Tuscan* Column is diminished at its Astragal or Neck of its Capital one 4th of its Diameter next above its Base ; the *Dorick* one 5th ; the *Ionick*, *Corinthian*, and *Composite*, each one 6th.

THE Diminution of every Column begins at one third of the Shaft's Height above the Base.

THE Heights of the *Tuscan* and *Dorick* Entablatures are each equal to one fourth of their Column's Height ; and the *Ionick*, *Corinthian*, and *Composite*, to one fifth of their Column's Height.

THESE general Proportions of their principal Parts being first understood, the Proportions of their particular Parts may be easily understood also as following.

CHAP. II. *Of PEDESTALS, and their Parts.*

EVERY perfect Pedestal consists of three principal Parts ; namely, a Base, Dado or Die, and Cornice, which are divided as follows.

The Division of the principal Parts of Pedestals explained.

R U L E. Divide the given Height in 4 Parts, as in Plates I, X, XXI, XXXIX, and LVII ; give the lower 1 to the Height of the Plinth ; one third of the next 1 to the Height of the Mouldings on the Plinth ; half the upper 1 to the Height of the Cornice ; and the Remains between will be the Height of the Dado.

WHEN a Column is placed on a Pedestal, the Projection of the Pedestal's Dado is found by the Projection of the Plinth to the Base

of the Column; which always stands perpendicular over the Upright of the Dado. But if a Pedestal is to be made without a Column, the Breadth of the Dado must be found, before we can proceed to determine the Projections of the several Members in the Base, and in the Cornice; because 'tis from the Upright of the Dado that their Projections are made; and which are found by the following Rules.

The Breadth of Dado's to Pedestals explained.

RULE I. *To find the Breadth of the Dado of the Tuscan Pedestal.* Plate I.

DIVIDE the Height of the Plinth and its Mouldings in 5 Parts, and the upper 1 in 7; on x with a Radius of 4 of the great Parts, and 4 sevenths, describe the Arch xg ; then xg is the Semi-breadth required.

RULE II. *To find the Breadth of the Dado of the Dorick Pedestal.* Plate X.

DIVIDE the Height of the Plinth in 5 Parts, and the upper 1 in 3; turn up 1 of the 3 Parts to n , and on x with the Radius of 5 Parts, and said one third, describe the Arch by ; then xy is the Semi-breadth required.

RULE III. *To find the Breadth of the Dado of the Ionick Pedestal.* Plate XXI.

DIVIDE the Height of the Plinth in 3 Parts, the upper 1 in 3, and the upper 1 thereof in 3 again; then abating the 2 upper small Parts, with the Remains of the Plinth's Height on x , describe the Arch vy ; then xy is the Semi-breadth required.

RULE IV. *To find the Breadth of the Dado of the Corinthian and Composite Pedestals.* Plates XXXIX and LVII.

DIVIDE the Height of the Plinth in 3 Parts, and the upper 1 in 3; on x , with the Radius of two Parts, and 2 thirds, describe the Arch vy ; then xy is the Semi-breadth required.

BEFORE I shew how to determine the Projections of the Mouldings on the Plinths, and in the Cornices of the Pedestals, I must shew how to divide their respective Heights. And, first, of the Mouldings on the Plinths of the several Pedestals.

6 The BUILDER'S JEWEL.

The Divisions of Mouldings on the Plinths of Pedestals explained.

RULE I. *To divide the Heights of the Mouldings on the Plinth of the Tuscan Pedestal. Plate I.*

DIVIDE the Height in 6, as at B; give the under and upper ones to the Fillets, and the middle 4 to the *Cima recta*.

RULE II. *To divide the Height of the Mouldings on the Plinth of the Dorick Pedestal. Plate X.*

DIVIDE the Height in 4 Parts, as at B; give the upper one to the Cavetto; half the next to its Fillet; half the lower one to the lower Fillet; and the Remains to the *Cima recta*.

RULE III. *To divide the Height of the Mouldings on the Plinth of the Ionick Pedestal. Plate XXI.*

DIVIDE the Height in 2, as at B; and each in 4; give the upper 1 and half to the Cavetto; the next half to its Fillet; the next 1 to the Astragal; the lower 1 to the Fillet; and the Remains to the *Cima*.

RULE IV. *To divide the Heights of the Mouldings on the Plinth of the Corinthian Pedestal. Plate XXXIX.*

DIVIDE the Height in 4, as at B; the upper 1 and 3d downwards, each in 3; give the upper 1 and half to the Cavetto; the next half to the Fillet; the next 1 to the Astragal; the lower 4th to the Height of the Torus; and one third of the next to its Fillet.

RULE V. *To divide the Heights of the Mouldings on the Plinth of the Composite Pedestal. Plate LVII.*

DIVIDE the Height in 4; and the upper and third Part downwards, each in 3; give the upper 2 of the upper Part to the Cavetto; the next 1 to its Fillet; the lower 4th Part to the Torus; and one third of the next Part to its Fillet.

The Division of Mouldings in the Cornices of Pedestals explained.

RULE I. *To divide the Heights of the Mouldings contained in the Cornice of the Tuscan Pedestal. Plate I.*

DIVIDE the Height, as at A, in 6 Parts; give the upper 1 to the Regula; the next 3 to the Plat-band; and the lower 2 to the *Cima reversa*.

RULE

RULE II. *To divide the Heights of the Mouldings contained in the Cornice of the Dorick Pedestal.* Plate X.

DIVIDE the Height, as at A, in 4; give half the upper 1 to the Regula; the next 1 and half to the Plat-band; the next 1 to the Ovolo; the upper one third of the lower 1 to the Fillet; and the remaining two thirds of the lower 1 to the Cavetto.

RULE III. *To divide the Heights of the Mouldings contained in the Cornice of the Ionick Pedestal.* Plate XXI.

DIVIDE the Height in 12 Parts, as at A; give the upper to the Regula; the next 2 to its *Cima reversa*; the next 3 to the Plat-band; the next 3 to the Ovolo; the next 1 to the Astragal; half the next 1 to its Fillet; and the Remains, 1 and a half, to the Cavetto.

RULE IV. *To divide the Heights of the Mouldings contained in the Cornice of the Corinthian Pedestal.* Plate XXXIX.

DIVIDE the Height in 3, as at A; also the upper 1 in 6, the lower half of the middle 1 in 3, and the lower half of the lower 1 in 3. Of the 6 upper small Parts, give the upper 1 and one third to the Regula; the remaining two thirds and two Parts to the *Cima reversa*; and the next 1 to the Astragal. Give the last 1, and half the middle great Part, to the Plat-band; also one third of the remaining half to the Fillet on the *Cima recta*; and the remaining two thirds, and the upper half of the lower great Part, to the *Cima recta*. Lastly, give the upper 1 Part of the half of the lower Part to the Astragal; half the next to its Fillet, and the Remains to the Cavetto.

RULE V. *To divide the Heights of the Mouldings contained in the Cornice of the Composite Pedestal.* Plate LVII.

DIVIDE the Height in 6 Parts, as at A; give half the upper 1 to the Regula; the next 1 to the *Cima reversa*; the next 1 and half to the Plat-band; one third of the next 1 to the Fillet on the *Cima recta*; the remaining two thirds, and the next 1, to the *Cima recta*; one third of the last 1 to the Fillet on the Cavetto; and the remaining two thirds to the Cavetto.

THE

8 *The* B U I L D E R's J E W E L.

THE Heights of the several Mouldings on the Plinths, and in the Cornices, being thus found; I shall proceed to shew how to give each its proper Projecture from the Upright of their Dado's.

The Projections of the Plinths, and Members on the Plinths, and in the Cornices of Pedestals, explained.

MAKE the Projection of the Plinth from the Upright of its Dado, in every Order, equal to the Height of the Mouldings on the Plinth; and make the Projection of every Cornice the same.

To find the Projections of the several Members.

DIVIDE the Projection of the *Tuscan* Plinth in 6, and of all the other Orders in 4; and then subdividing the Parts, as exhibited in the Scales of Projection, which are placed between the Base and Cornice of each Pedestal; from thence, stop; or terminate the Projection of each Member, as by Inspection is shewn; and thus are the five Orders of Pedestals compleated.

C H A P. III. *Of Columns and their Parts.*

A COLUMN consists of three principal Parts, viz. A Base, Shaft, and Capital.

The Heights of Columns explained.

To find the Heights of Columns, having the Heights of the Columns and Entablatures given, these are the Rules.

R U L E. I. *In the Tuscan and Dorick Orders. Plate I. and X.*

DIVIDE the given Height of the Column and Entablature in 5 Parts; the upper 1 is the Height of the Entablature, and the lower 4 of the Column. Divide the Height of the *Tuscan* Column in 7, and of the *Dorick* in 8; and 1 is the Diameter of the Column.

R U L E. II. *In the Ionick, Corinthian, and Composite Orders. Plates XXI. XXXIX. and LVII.*

DIVIDE the given Height of the Column and Entablature in 6 Parts; the upper 1 is the Height of the Entablature, and the lower 5 of the Column. Divide the Height of the *Ionick* Column in 9, and the *Corinthian* and *Composite* Columns each in 10 Parts, and 1 is the Diameter.

The

The Heights and Projections of the Bases of Columns explained,

THE Height of the Base of every Column is precisely half its Diameter next above the Base; and the Projection of the Plinth, from the Upright of the Shaft, is always equal to one 6th of the Column's Diameter.

The Height of Plinths to the Bases of Columns is either equal to half the Height of the whole Base, as in the *Tuscan* Base, Plate II. or to one third of the Base's Height, as in the *Dorick* Base on the Right-hand Side, Plate XI. And in the *Ionick*, *Corinthian* and *Composite* Bases, Plates XXII. XLI. and LVIII.

To make the Construction of Bases to Columns easy, I will explain how to divide the Heights and terminate the Projections of the Members contained in the *Tuscan* and *Dorick* Bases; by which those of the *Ionick*, *Corinthian* and *Composite* will be understood, as being no more than Repetitions of the like Rules.

RULE I. *To divide the Heights, and terminate the Projections of the Members contained in the Base of the Tuscan Column. Plate II.*

I. *To determine their Heights.*

DIVIDE the Height in two, and give the lower 1 to the Plinth as aforesaid. Divide the upper 1 in 4; give the lower 3 to the Torus, and the upper 1 to the Cincture.

II. *To determine their Projections.*

DIVIDE the Projection of the Plinth, from the Upright of the Shaft in 4 Parts, and the second Part in 4; then 1 Part and 3 fourths of the second, stops the Cincture; and the Torus is always in every Order the same Projection as the Plinth.

RULE II. *To divide the Heights, and terminate the Projections of the Members contained in the Attick Base to the Dorick Column, on the Right-hand Side of Plate XI.*

I. *To determine their Heights.*

DIVIDE the Height in 3 Parts; the middle Part in 4, and the upper Part in 2: Give the lower 1 Part to the Plinth, as aforesaid; three fourths of the next to the lower Torus; and half the upper to the upper Torus. Divide the Remainder between the two
Torus's

Torus's in 6; give the upper and lower ones to the two Fillets; and the middle 4 to the Scotia.

II. *To determine their Projections.*

DIVIDE the Projection of the Plinth in 4 Parts, and the 2d and 3d Parts in Halves. From whence perpendicular Lines being drawn up, will terminate the Cincture, and the two Fillets of the Scotia.

RULE I. *To describe the Curve of this Scotia.*

DIVIDE the Height in 3 Parts, as at B; and draw the Lines $c b z$ and $a b$. On b , describe the Quadrant $a d$; and on the Point z , the Arch $c d$, which together form the Curve of the Scotia to the Attick Base.

I will also now shew how to describe the Scotia in the Ionick, Corinthian and Composite Bases, as expressed at large by Figure A. Plate XLI.

DIVIDE the Height $b g$ in 7 Parts; from the third Part draw $f c$ parallel to the Fillets, and equal to 3 Parts; thro' the Point f draw the Line $a e$ parallel to $b g$, and make $f a$ equal to 4 Parts of $b g$. Draw $a c$, and then, on the Point c , describe the Arch $b x d$, and on a the Arch $d e$.

HAVING thus explained the Bases, or first Parts of Columns, I shall now proceed to the second Parts, which is their Shafts.

THE Shaft of a Column is that Part which is contained between its Base and Capital; and consists of 3 Parts, *viz.* its Cincture, Trunk, and Astragal; excepting in the *Tuscan*, where the Cincture is made a Part of the Base to the Column.

To render the Shafts of Columns agreeable to the taper Growth of the Trunks of Trees, (with which the first Columns were made) their Shafts, or rather their Trunks are therefore diminished from the lower third Part, up unto the Astragal, as following.

The Shafts of Columns, and their Diminution explained.

RULE. *To diminish the Shafts of a Column.* Plate I. Fig. A.

SET up the Shaft's Height; at $i k$, its Astragal, set off its diminished Diameter, *viz.* three fourths, as being *Tuscan*. Compleat the lower third undiminished Part of the Shaft, and on $a d$ its upper

Part

Part describe the Semicircle $abcd$. From ik , draw the Lines ib , ic , parallel to bn the central Line, cutting the Semicircle in b and c .

Divide the Arches ab and cd , each into any same Number of Parts; suppose 4; and divide bn into the same Number of Parts also, as at the Points of gfe ; through which draw right Lines at right Angles to bn of Length at Pleasure. From the 4 Divisions in the Arch ab , to those in the Arch cd , draw Ordinates (as those dotted.) Make the Diameter of the Shaft at e , equal to the Length of the first Ordinate; at f , to the Length of the second Ordinate; and at g , to the Length of the third Ordinate. Then from the Points ik , through the Extremes of the Diameters g, f, e , to the Points ad , trace the Contours or Out-lines of the Shaft's Diminution.

The Manner of Rusticating the Shafts of Columns explained.

THE Shafts of the *Tuscan*, *Dorick*, and *Ionick* Columns, are sometimes rusticated; but those of the *Corinthian* and *Composite* seldom or ever.

RULE. To rusticate the *Tuscan*, *Dorick*, and *Ionick* Shafts.

DIVIDE the Height of the *Tuscan* in 7, as in Plate I. the *Dorick* in 8, as in Plate X. and the *Ionick* in 9, as in Plate XXI; then the Blocks and Intervals in the *Tuscan* and *Ionick* will each be 1 Diameter, and those of the *Dorick* 2 Diameters.

THE Projection of the Blocks are generally made equal to the Projection of the Plinth, as expressed in the *Tuscan* Order, Plate I. and continued upright without Diminution; but as the upper Parts of the Shafts seem thereby overcharged, I therefore recommend the Diminution to be parallel with the Shaft, as in the *Dorick* Order, Plate X.

The Manner of Fluting the Shafts of Columns explained.

THE Shafts of the *Dorick*, *Ionick*, *Corinthian*, and *Composite* Columns, are sometimes fluted and cabled; but the Shaft of the *Tuscan* Column seldom or ever was, as being an Embellishment too gaudy for so robust and simple an Order, whose Beauty consists in its native Plainness; and indeed all Columns have a grander Aspect when

when entirely plain, than when rusticated or fluted. The *Dorick* Shaft, with respect to its Herculean Aspect, should not be fluted; but as the Ancients dispensed therewith, the Moderns frequently do the same. But however, as herein Majesty must be preserved, therefore the Ancients allowed but 20 Flutes, and those without Fillets, as in the Left-side of Plate XI. thereby making them of a masculine Aspect; whilst those of the *Ionick* and *Corinthian* Shafts are charged with 24 Flutes, and as many fillets (each of which are equal to one third of a Flute) which renders them less capacious and of an effeminate Aspect, agreeable to the Characters of those Orders.

RULE. *To divide the Flutes of a Dorick Column.* Plate XI.

DIVIDE the Circumference into 20 equal Parts, and draw Lines, thereby making a Polygon of 20 Sides; on each Side compleat an equilateral spherical Triangle, as $a b c$ on the Left of Plate XI. and on the external Angle, as b , describe the Curve $a c$, which is the Depth or Sinking-in of a Flute.

RULE. *To divide the Flutes and Fillets of an Ionick, Corinthian, or Composite Column.* Plate XXV.

DIVIDE the Circumference of the Semi-Column in 12 Parts, and each Part in 8, as $a b$. Give 3 Parts to each Semi-Flute, as $a b$, and $i b$; and two Parts to each Fillet, as $b i$.

THE Sinkings or Depths of these Fillets are either the Arch of a Quadrant, as those on the Right-hand described on the Centers $c e$, &c. or of a Semi-circle, as those on the Left, described on the Centers $x x$, &c.

RULE. *To describe Cablings, in the Flutes of a Column.* Plate XXV.

ON the Points $z z$, with the Radius $z x$, describe the Arches $y x o$, $y x o$, &c. which are the Bases of the Cablings, and whose Height finishes at the first third Part of the Shaft's Height.

RULE. *To set out Flutes and Fillets on the Shaft of a Column.* Plate XXVI.

ON a Pannel, &c. draw a right Line, as $a b$, and thereon set off
24 equal

24 equal Parts at Pleasure, which together must always be less than the Girt at the Astragal of the Column to be fluted.

DIVIDE any 1 Part in 4 Parts, and take 1 Part in the Compasses, and set it off in every of the other 23 Parts; and from the several Parts so divided (which will be to one another as 1 to 3; that is, a Fillet to a Flute) draw up right Lines at right Angles from the divided Line. This done, strike a perpendicular Chalk-Line down the Front of the Column. And being provided with two straight-edged Pieces of Parchment, &c. therewith girt the Column at its Base, and at its Astragal. Apply the Girts so taken to the parallel Lines aforesaid, so that their Extremes shall just touch the two outer Parallels, as at *e c* and *d f*. Then keeping them there, with a Pencil mark their Edges at the Meeting of each Parallel; and thereby the two Girts will be divided into the Flutes and Fillets, agreeable to your Column to be fluted. This done, apply any End of each of the Parchment Girts to the Bottom and the Top of the Front central Line; and then embracing the Column at its Base and Astragal, remove each Girt, until you bring the Middle of a Flute on the central Line; and then prick off the Breadth of every Flute and Fillet in the two Girts, which will stand exactly perpendicular over each other.

Note, In large Columns it may be necessary to set out the Breadths of the Flutes and Fillets, in one or more Places, between the first third Part of the Shaft's Height and the Astragal; which, when required, may be most exactly done, by girting at the Parts required, and proceeding afterwards in every other respect, as aforesaid.

The Fluting of Pilasters explained.

R U L E. To flute a Pilaster with Fillets, and a Bead at each Quoin. Plate XXXVII.

DRAW a Line at Pleasure, as *a b*, and thereon set 31 equal Parts, which together shall be greater than the Pilaster to be fluted. Take the 31 Parts in your Compasses, &c. and on the first and last Points make the Section *c*, and draw the Lines *c a* and *c b*, which will compleat an equilateral Triangle. Set the Breadth of the Pilaster

B

from

from *c* to *d*, and to *e*, and draw the Line *d e*, which being parallel to *a b*, is therefore equal to the Breadth of the Pilaster. Now right Lines drawn, from the 31 Parts, to the Point *c*, they will divide the Line *d e*, in similar 31 Parts also. Of which give the 2 outer Parts to the two Beads at the Quoins; the next 2 outer ones to the outer Fillets; the next 3 to the Breadth of a Flute; the next 1 to a Fillet; the next 3 to a Flute; the next 1 to a Fillet, &c.

Note, By the same Rule a Pilaster with Flutes and Fillets only, as Fig. A, is divided from 29 Parts, first set off at Pleasure; and then proceeding as before.

HAVING thus explained the Bases and Shafts of Columns, &c. I shall now proceed to their Capitals.

OF Capitals, there are two Kinds, *viz.* the one consisting of Mouldings only, as those of the *Tuscan* and *Dorick*; and the other of Mouldings and sculptured Ornaments, as the *Ionick*, *Corinthian* and *Composite*.

The Heights of Capitals explained.

THE Height of the *Tuscan* and *Dorick* Capitals are each precisely a Semidiameter, as in Plates II. and XI. The Height of the ancient *Ionick* Capital, in its Mouldings above the Astragal of the Shaft, is but one third of a Diameter, or 20 Minutes; but including the Depth of its Volute, 'tis 35 Minutes, as in Plate XXIII. which exceeds the Volute to the modern Capital by 5 Minutes. The Height of the *Corinthian* Capital is one Diameter and one sixth; as also is the Height of the *Composite* Capital.

The Divisions and Projections of the Members in the Tuscan and Dorick Capitals explained. Plates II. and XI.

RULE I. To divide the Heights, and determine the Projections of the Members in the Capital of a *Tuscan* Column or Pilaster.

I. To divide the Heights of the Members. Plate II.

DIVIDE the Height in 3 Parts (as on the Left-side.) Divide the middle 1 in 6; of which give the lower to the Fillet under the Ovolo, and the other 5 to the Ovolo. Divide the upper 1 into 4; give the upper 1 to the Fillet, and the other 3 to the Fascia.

the Abacus. Set down *ab*, half the Height of the Frize or Neck of the Capital, from *b* to *c*, and divide it in 3 Parts; give the upper 1 to the Astragal, and the lower 1 to its Fillet.

II. *To determine the Projections.*

DIVIDE the Semi-diameter of the Column at its Astragal (as is done above on the Capital) in 6 Parts, and give 3 to the Projection of the upper Fillet.

BUT if the Capital is of an undiminished Pilaster, (as on the Right-hand Side of Plate II.) then divide the Semi-diameter of the Pilaster (as above on the Capital) in 8 Parts, and give 3 to the Projection, as before.

Note, BY the Scale of Projection, placed against the Neck of the Capital, you see that the whole Projection is divided in 3; the first in 2; and the last 1, in 4; the half of the first 1 stops the Projection of the Fillets under the Astragal and Ovolo; and the 2 first of the 4, in the outer 1 third Part, stops the Ovolo and Fascia of the Abacus.

RULE II. *To divide the Heights, and determine the Projections of the Members contained in the Capital of a Dorick Column or Pilaster.* Plate XI.

I. *To divide the Heights of the Members.*

DIVIDE the Height in 3 Parts (as on the Left-side.) Divide the middle 1 in 3; of which the lower 1 divided in 3, give the upper 1 to the Astragal, and the lower 1 to the Fillet. Divide the upper Part in 3; give the lower 2 to the Fascia of the Abacus; and the upper 1 thereof divided in 3, give the upper 1 to the Fillet, and the lower 2 to the *Cima reversa*.

Note, THE Height of the Astragal to the Shaft is found, as before in the *Tuscan Column*, Page 11.

II. *To determine their Projections.*

DIVIDE the Semi-diameter of the Column at its Astragal (as done above on the Capital) in 4; and give 2 to the Projection of the upper Fillet. But if the Capital is of an undiminished Pilaster, (as on the Right-hand Side) then divide the Semi-diameter of the

Pilaster (as above on the Capital) in 5 Parts, and give 2 to the Projection, as before.

By the Scales of Projection on each Side of the Capital, you see, that the whole Projection is there divided in 4 Parts; from which, and their Sub-divisions, the several Members in the two Varieties of Capitals have their Projections determined.

The ancient Ionick Capital, and its Volute explained. Plate XXIII.

R U L E I. To divide the Height of its Members, and describe its Volute.

I. *To divide the Height of its Members.*

DIVIDE the given Height as kx , in 11 Parts; give the upper 1 to the upper Fillet; the next 2 to the *Cima reversa*, which with the aforesaid Fillet makes the Abacus: give the next 1 to the List of the Volute; the next 3 to the Band of the Volute; and the remaining 4 to the Ovolo. This done, set down 8 of the above 11 Parts from x to I; give the first 2 to the Astragal; the next 1 to its Fillet; and the lower 5 to the Depth of the Volute. Divide rs on the Right-hand (which is equal to kx , or 23 Minutes, the Height of the Mouldings of the Capital) in 4 Parts, and turn down 1 Part to d ; then rd will be equal to 20 Minutes, which is equal to the Semi-diameter of the Column at its Shaft. Now admitting bv to be the central Line of the Column, make vc equal to rd , and draw the Line ecb , which will be the Upright of the Column. Make bg equal to two thirds of $a1$, the Height of the Astragal; and from the Point g draw the Cathetus or Line fg , parallel to the central Line. Divide gb in 4 Parts; the first 1 stops the Astragal at a . Make fn equal to fi , which will terminate the Projection of the Abacus.

R U L E II *To describe the Ionick Volute.* Plate XXIII.

FROM 1 Part below x , draw the Line pmo for the central Line of the Astragal, intersecting the Cathetus ig in o . On the Point o , with the Radius oz , describe the Circle or Eye of the Volute (which is represented at large by the Figure R,) wherein inscribe the Geometrical Square, and draw its Diameters 2, 4; and 1, 3; divide each

each Semi-diameter in 3 Parts, as at the Points 6. 10; 5. 9; 12. 6; and 11. 7; which are the Centers numbred in Order, on which the Out-line of the Volute is described, viz. The Point 1 is the Center to the Arch *i m*; the Point 2, of the Arch *m g*; the Point 3, of the Arch *g p*, &c.

THE inward Line of the Lift of the Volute is described on 12 other Centers, which are at one fifth of the Distance between the other 12 Centers, and which are signified by the small Divisions next within the 12 Centers in the Eye of the Volute at large, in Plate XXII.

To gradually diminish the lift of this Volute, we must divide its Height or Breadth in 12 Parts, as expressed above in Plate XXII. and at every Quarter of its Rotation abate its Breadth 1 of those Parts, as expressed by the numerical Figures affixed; which will cause it to terminate at the eye in a Point.

Note, FIG. AB, Plate XXIII. is a View of Half a Side of the Capital, wherein B shews the Thickness of the Volute, whose Height is equal to *i g* in the Front. The Heights of the other Parts are shewn by the Scale of Parts on the left; and is the same as the like Scale above.

Note, THE Abacus to this Capital being square, is therefore called by Workmen a *Trencher-Capital*; and indeed very properly, because the word *Abacus* is derived from the Greek Word *Abax*, signifying a square Trencher.

The modern Ionick Capital explained. Plate XXIV.

RULE. To divide the Heights of the Members contained in its Abacus, and to determine their Projections

THIS Capital, tho' call'd modern, was invented by VINCENT SCAMMOZZI; and, including its Volute, is precisely half a Diameter in Height.

I. To find the Heights of the Members.

DIVIDE its Height in 3 Parts, and the upper half of the upper 1 in 4, as on the left; of which give the upper 3 to the Ovolo, and the other one to the Fillet under it. Divide the lower 2 Parts

B 3

and

and half in 8 parts (as on the Right) give the upper 1 and half to the Fascia of the Abacus; the next half to the Recess under the Abacus; the next 2 to the Ovolo; the next 1 to the Astragal; and, next half to its Fillet,

II. *To find the Projections of the Members.*

DRAW the central Line of the Column bg ; and in any Place, as at g , draw the Line ab at right Angles to bg , and of Length at Pleasure. Make gc and gd , each equal to the Semi-diameter ik ; and divide it into 12 Parts, each representing 5 Minutes (or one 12th of a Diameter;) make ca and db , each equal to 15 Minutes, or one fourth of a Diameter, which terminates the Projection of the extreme Parts or returned Horns of the Abacus; as exhibited by the dotted parallel Lines drawn thence up to them.

AND from the Subdivisions of the 2 outer 5 Minutes, the Projections of the other Parts of the Abacus are determined in the same Manner; as also are the Projections of the Ovolo, Astragal, and Fillet, represented by dotted Lines within the Volute.

THE Volute of this Capital is represented in Plate XXII. and is described the same as that of the ancient Capital; for though it appears to be elliptical when seen in a direct View, as being thereby something fore-shortened, yet 'tis circular, as the other.

UNDER this Capital I have placed half its Plan; whose Construction being plainly exhibited by the dotted perpendicular Lines, proceeding from the Members in the Elevation, needs no further Explanation.

The Corinthian Capital explained. Plate XLI.

THIS Capital was originally adorned with the Acanthus Leaves only; but as some delight in Variety, I have therefore in Plate XL. given the Acanthus with the Olive, Laurel and Parsley, to be employed at Discretion.

THE Height of this Capital was originally but 1 Diameter; but modern Architects thinking it too short, they therefore added 10 Minutes, thereby making its Height 70 Minutes, and giving it a much more magnificent Aspect than it had before.

By

By the Measures affixed, which is no more than the Height divided in 7 Parts, of which the upper one is the Abacus, the Height of every Part is adjusted; and by the Plan and Elevation in Plate XLII. the Breadths and Distances of the Leaves, &c. are fully exemplified in the like Manner.

IN the Drawing of this Capital, the young student must first accustom himself to express only the Leaves in Gross, as expressed in this and the XLIVth Plate, until he has made himself a Master of forming their Out-lines; when it will be a pleasure to raffle them, as expressed in Plate XLIII. and XLV.

AND as the Capital of a Pilaster has all its Leaves in each Face in a direct View, contrary to those of a Capital to a Column, and is one sixth of a Diameter more in Breadth; I have therefore, to explain the Difference and Parts, shewn in Plate XLIV. the Plan and Elevation of a Capital to a Pilaster, in the same Manner as that of a Column in Plate XLII. as indeed I have also the Elevation of a half Capital at large, with its Leaves raffled, as those of Plate XLIII.

The Composite Capital explained. Plate LVIII.

THIS Order is called *Composite*, because its Capital is composed of the *Ionick* and *Corinthian* Capitals; that is, its Abacus, Volutes, Ovolo, and Astragal between them, are the very Members which form the modern *Ionick* Capital. Its two Heights of Leaves are the very same as those in the *Corinthian* Capital; and its Stalks, which in the *Corinthian* Capital finish with Volutes and Helices, are here stopt by the *Ionick* Volutes, and made to finish inwardly with Husks on Tendrels, called Caulicoles.

THE Height of this Capital is the same as that of the *Corinthian*, and is divided in 7 Parts also, of which the upper 1 is the Height of the Abacus; and which being divided in 2, and the upper 1 in 5, the upper 4 is the Height of the Ovolo, and the lower 2 of the Fillet. Divide the lower Half of the Height of the Abacus with the next two Parts into 1, and then finish the Volute exactly the same, as in the modern *Ionick* Capital, Plate XXIV.

Now,

Now, as the remaining Part of this Capital is entirely *Corinthian* as before proved, 'tis needless to say more thereof; but that it may be fully exemplified, I have therefore shewn its Elevation at large in Plates LIX. and LX. as well for a Pilaster, as for a Column; as I have done before in the *Corinthian* Order.

CHAP. IV. Of Entablatures.

AN Entablature is the uppermost or last principal Part of an Order, (which *Vitruvius* called *Ornament*) and consists of 3 Parts viz. an Architrave, a Freeze or Frize, and a Cornice.

THE Heights of Entablatures being declared in Chap. I. we are now to observe that their Projections are equal to their Heights, in all the Orders, excepting the *Dorick*, and that only but when its Mutules are introduced; when it then consists of half the Entablature's whole Height.

THE Heights of the several Entablatures are thus divided into their Architraves, Frizes, Cornices, &c.

RULE I. To divide the *Tuscan* Entablature into its Architrave, Frize, Cornice, &c. Plate III.

First, DIVIDE the given Height into 7 Parts; give 2 to the Architrave, 2 to the Frize, and 3 to the Cornice.

Secondly, DIVIDE the Height of the Architrave in 7 Parts; give 2 to the lower Fascia, 4 to the upper Fascia, and 1 to the Tenia, whose Projection is equal to its Height; and which being divided in 3, give 1 to the Projection of the upper Fascia.

Thirdly, DIVIDE the Height of the Cornice in 3; divide the upper 1 in 4, and give the upper 1 Part to the Regula, and the other 3 to the *Cima recta*. Divide the middle 1 in 6; give the upper 1 to the Fillet, and the other 5 to the Corona. Divide the lower 1 in 2; give the upper 1 to the Ovolo; and the lower half divided in 4, give the upper 1 to the Fillet, and the other 3 to the Cavetto.

By the Scale of Projection is seen, that the Projection of the Corona is two thirds; the Ovolo, one third; and the Fillet of the Cavetto, one sixth of the whole.

Note,

Note, By well understanding the Manner of proportioning this Entablature, (which is very easy) the others following will become as easy: But that the young Student may not be at any Stand therein, I will, for a further Explanation, explain the Entablatures of the *Dorick* and *Ionick* Orders in the same Manner.

RULE II. To divide the *Dorick* Entablature into its *Architrave*, *Frize*, *Cornice*, &c. Plate XII.

First, DIVIDE the Height in 8 Parts; give 2 to the *Architrave*, 3 to the *Frize*, and 3 to the *Cornice*.

Secondly, DIVIDE the upper 1 of the *Architrave* into 3, and give the upper 1 to the *Tenia*: Divide the lower 2 in 6; give the upper 1 to the *Fillet* over the *Gutta*'s, and the next three to the *Gutta*'s.

DIVIDE the lower third Part of the Height of the *Cornice* in 3, and give the lower 1 to the *Cap* of the *Triglyph*. Divide the remaining Part of the *Cornice*'s Height in 4 Parts, and the upper 1 Part in 4; of which give the upper 1 to the *Regula*, or upper *Fillet* on the *Cima recta*; and the lower 3 to the *Cima recta*. The next Part divided in 3, half the upper 1 is the *Fillet*; and the Remainder the *Corona*. The next Part being also divided in 3, the Upper 1 is the *Capping* of the *Mutule*, and the lower 2 the *Mutule*. Lastly, the lower 4th Part divided in 3, the upper 1 is the Depth of the *Ground* to the *Mutules*; and half the lower 1 is the *Fillet* to the *Ovolo* of the *Bed-mould*.

THE Projection of this *Cornice* (as before observed) is half the Height of the whole Entablature; and which being divided in 4, as on the *Cima recta*, has the Projections of its Members determined, as by Inspection is shewn.

Now 'tis to be noted, That the Breadth of a *Triglyph* is always equal to half the Columns Diameter at its Base; that its Channelings and *Gutta*'s are found by dividing the Breadth of the *Triglyph* into 12 Parts, as exhibited at large in Plate XIII. That the Distances between the *Triglyphs* must always be equal to the Height of the *Frize*, and therefore will become exactly square. That these Intervals or Squares are called *Metopes*; and are sometimes enriched with

with Roses, as here expressed, or otherwise at the Pleasure of the Architect; and that the Manner of forming the Planceer of this Cornice is shewn in Plate XIV.

RULE III. *To divide the Ionick Entablatures into the Architrave, Frize, Cornice, &c.*

As this Order has two Varieties of Entablatures, viz. the one with Dentules, and the other with Modillions; I have therefore shewn them both, and by explaining of one, the other will be understood.

To divide the Ionick Entablature with Dentules. Plate XXVIII.

First, DIVIDE the Height in 10 Parts, give 3 to the Architrave, 3 to the Frize, and 4 to the Cornice.

Secondly, DIVIDE the upper 1 Part of the Architrave in 4; give the upper 1 to the Fillet; the next 2, and 1 fourth of the lower 1, to the *Cima reversa*; and the remaining 3 fourths of the lower 1 to the Bead. These Members together are called the Tenia of the Architrave, whose Fillet's Projection is equal to their whole Heights.

Thirdly, As the Frize of this Order is made swelling, therefore divide the Height in 4, and on the middle 2 make the Section \times , on which describe the Curve of the Frize.

Fourthly, THE Height of the Cornice being in 4 Parts, divide the upper 1 in 4; give the upper 1 to the Regula or Fillet on the *Cima recta*, and the remaining 2, with 2 thirds of the lower 1, to the *Cima recta*; and the 1 third give to the Fillet on the *Cima reversa*.

DIVIDE the next Part in 4; give the upper 1 to the *Cima recta*, and the other 3 to the Corona.

DIVIDE the next or 2d part in 6; give the upper 3 to the Ovolo, the next 1 to its Fillet, and the next 1 to the Fillet between the Dentules.

DIVIDE the lower 1 in 3; the upper 1 will terminate the depth of the Dentules. Divide the middle 1 in 3, and the upper 1 will be the Depth of the Denticule or Fascia, on which the Dentules

are

are fixed, and the remains will be the *Cima reversa*, and lower Member of the Entablature.

THE Projection is divided into 4 principal Parts, as by the Scale against the Frize is shewn, by which its Members are terminated, as by inspection is plain,

To divide the Ionick Dentules.

IN an Entablature over a Column, divide the Distance between the central Line, and the Upright of the Shaft at its Neck, into 10 Parts; give 2 Parts to the Breadth of a Dentule, and 1 to an Interval. But in an Entablature over an undiminished Pilaster, divide the aforesaid Distance into 12 Parts, and proceed as before.

Note, THE Breadth of a Dentule is 5 Minutes, and of an Interval 2 Minutes and a half, which are described at large in Plate XXX.

Now, as the *Ionick* Entablature with Modillions, as expressed in Plate XXIX. has its Members proportioned in like Manner, I therefore need only to note, That the Breadth of each Modillion is 10 Minutes; that the Distance or Interval between them is 25 Minutes in an Entablature to a Column, and 30 Minutes in an Entablature to an undiminished Pilaster. And that the Curve of the Sophete of the *Ionick* Modillion is described at large in Plate XXX. as following.

The Height and Projecture being before found,

DIVIDE the Length in 6 Parts; and on the Point 5 erect the Perpendicular 5 *a* equal to 2 Parts and a half; also from the Point 2, let fall the Perpendicular 2 *b*, equal to 1 Part and a half, and draw the Line *ab*. On the Point 2, describe the Arch 1 *d*; on the Point *b*, the Arch *dc*; and on the Point *a* the Arch *c* 5.

Note, THE Manner of forming the Return of the Planceer of this Cornice is shewn in Plate XXXI.

RULE III. *To divide the Corinthian Entablature into its Architrave, Frize, and Cornice.* Plate XLVI.

1. DIVIDE the Height into 10 Parts; give 3 to the Architrave, 3 to the Frize, and 4 to the Cornice.

2. DIVIDE the Height of the Architrave, and of the Cornice, each in 5 Parts, and subdivide them, as exhibited; and then proceed in every Respect as in the preceding Orders.

Note,

Note, THAT tho' the Dentules are expressed in this Cornice, they are not always used.

THAT the Breadth of the Modillions are 10 Minutes, as before in the *Ionick*, but their Distances are greater.

The Interval between Modillions in a Cornice over Columns is 25 Minutes; and in a Cornice over undiminished Pilasters, 30 Minutes.

To render the Parts of this Modillion plain and intelligible, I have shewn it at large in Front and Profile, with its Measures, in Plate XLVII. wherein Fig. A represents the Eye of its Volute at large with the Centers numbered; on which its Curves are described in the very same Manner, as the Volute of the *Ionick* Capital.

BETWEEN the Modillions the Planceer of the Sophete of the Corona is enriched with Roses in hollow Pannels, called Coffers as expressed in Plate XLVIII. which also shews the Manner of returning the Sophete at an external Angle.

RULE IV. *To divide the Composite Entablature into its Architrave, Frize, and Cornice.* Plate XLI.

First, DIVIDE the Height into 10 Parts; give 3 to the Architrave, 3 to the Frize, and 4 to the Cornice.

Secondly, DIVIDE the Heights of the Architrave, and of the Cornice, each into 4; subdivide their Parts, draw in and terminate their Members by the Scale of Projection, as before done in the preceding Orders. The Manner of enriching the Planceer of the Corona of this Cornice, and returning it at an external Angle, is exhibited in Plate LXII.

CHAP. V. *Of Doors, Windows, Porticos, Arcades, and the Intercolumnation of Columns in general.*

THAT the Young Student may have Pleasure in the Process of this Study, I have given him an Example of a Door square and circular-headed, with circular and pitched Pediments, a Window, a Portico, and an Arcade, with their Imposts and Architraves in each of the first 4 Orders; which immediately follow their respective

spective Entablatures; and which having their principal Parts determined by their Measures affixed, need no other Explanation. And in order to further enable him in the Art of Designing, I have shewn the proper Intercolumnations, or just Distances, that the Columns of every Order must be placed in from each other, when employed in Colonades, &c. by which he may form new Designs at his Pleasure. See Plates VI, XVII, XXXIV, XXXV, and LIII.

CHAP. VI. *Of Pediments, and the Manner of finding their Raking and Returned Mouldings for their Cornices, and for Capping of their Raking Mutules and Modillions.*

PEDIMENTS, which the French call *Frontons*, from the Latin *Frons*, the Forehead, are commonly placed over Windows, Doors, Portico's, &c. to carry off the Rains, and to enrich the Order on which they are placed.

PEDIMENTS are either entire or open; and those are straight, circular, compound, &c.

AN entire straight Pediment is generally called a pitched Pediment, as the lower Pediment in Plate LXIX. And an entire circular Pediment is generally called a Compass Pediment, as the upper Pediment in Plate LXIX.

WHEN a Pediment consists of more than one Arch, as those in Plates LXXI, and LXXII, they are called entire compound Pediments.

OPEN Pediments are those, whose raking Members are stopt in some certain Place between the Points of their Spring, and their Fastigium or vertical Point; as those in Plate LXIII, the lower Pediment in Plate LXXI, and the upper in Plate LXXIV.

ENTIRE Pediments are the first Kind that were made, and were originally placed to Portico's at the Entrances into Temples; but now we place them to Frontispieces of Doors, Windows, &c. for Ornament and Use.

As the entire Pediment by its reclining Surfaces carries off and discharges the Rains at its Extremes, therefore none but entire Pediments

ments should be employed abroad; whilst the broken or open are employed for Ornament only within-side, where no Rains can come.

'Tis true we may daily see open Pediments placed without-side, as is done by *Inigo Jones* at *Shaftsbury House* in *Aldersgate-street*, *London*. But, surely, nothing can be so absurd, (unless it is the placing of an entire Pediment within-side a Building, where no Rains can fall; as done by *Mr. Gibbs* within the Church of *St. Mary le Strand*) because, by their being open, they receive the Rains, and discharge them in Front, as a straight and level Cornice doth; and therefore of no more Use.

As Pediments, when well applied, are very great Enrichments to buildings, and in many Cases are very useful, I have therefore given 14 Varieties for the young Student's Practice, with their Measures affixed; by which they may be drawn and worked of any Magnitude required. *Vide Plates LXIX, &c.*

IN the Working of Pediments, the chief Difficulty is, to form the Curves of the Raking and Returned Cornices, that shall exactly accadeer, or meet at their Mitres; which may be truly worked, as following.

RULE. *To describe the Curve of the Raking Cima recta of a Pediment, having the Curve of the straight or level Cornice given.* Plate LXV.

LET $a b g$ be the given *Cima recta*; divide its Curve in 4 equal Parts at the Points $d e f$; and draw the Ordinates $i f$, $k e$, and also $g d$; from the Points $d e f$, draw the raking Lines $f q$, $e r$, $d x$; and the perpendicular Lines $d k$, $e l$, $f m$. In any Place, as at $n o$, draw a right Line at right Angles to the raking Lines; and making the Ordinates in Fig. B, as $w q$, $n r$, $t s$, equal to the Ordinates $i f$, $k e$, $g d$, in Fig. A, through the points $q r s$, trace the Curve $p q r s n$, which is the Curve of the Raking *Cima recta* required. And tho' strictly speaking, each half is a Part of an Ellipsis; yet, if Center be found that shall describe the Arch of a Circle to pass through the three points $p q r$, and $r s n$, it will not be in the Power of the most inquisitive Eye to discover the Difference.

To describe the Curve of the Returned Cornice.

FROM *p*. Fig. C, set back *p o*, the Projection *b g* in Fig. A; and draw the Perpendicular *o n*, on the Top of the Fillet *p o*; make the Distances *p t*, *t v*, *v w*, equal to the Distances *b k*, *k l*, *l m*, in Fig. A; and drawing the Lines *w x*, *v r*, *t g*, parallel to the Perpendicular *o n*, they will cut the Raking Lines in the Points *q r s x*. From the Point *p*, thro' the said Points to *n*, trace the Curve *p q r s x*, which is the Curve of the Returned *Cima recta*, as required; for its Ordinates at those Points are equal to the Ordinates in Fig. A.

By the same Rule, the Curves of the Raking and Returned Ovolo's, Plate LXVI, the Raking and Returned Cavetto's, Plate LXVII, and the Raking and Returned *Cima reversa*, for the Capping of Raking Mutules and Modillions, Plate LXVIII, are found, as is evident to the first View.

CHAP. VII. *Of Block and Cantaliver Cornices, Rustick Quoins. Cornices and Coves, proportioned to Rooms of any Height, Angle-Brackets, Mouldings for Tabernacle-Frames, Pannels and Centering for Groins.*

I. **O**F Block Cornices I have given three Varieties in Plate LXXV; where I have first shewn them in small, to express the Breadth of their Block-Trusses, and Distance at which they are to stand; as likewise the Manner of applying them over Rustick Quoins; and secondly, at large, the better to express the Division of their Members.

II. IN Plate LXXIX, I have given an Example of a Cantaliver Cornice at large, which in lofty Rooms under a Cove has a very grand and noble Effect. The Breadth of a Cantaliver is one 4th of its Height, which is equal to the Height of the Frize; and the Distance they are placed at is the same as their Height; thereby making their Metopes exactly a geometrical Square, as in the *Dorick* Order.

III. COVES to Cielings are of various Heights; as one third, one fourth, one fifth, one sixth, two sevenths, two ninths, &c. of the whole Height.

A COVE of one third, at Fig. A, Plate LXXXI, is best for a lofty Room ; and when Windows are made therein, the Groins make a very agreeable Figure, and take off the seeming Heaviness which an entire Cove of a large Height imposes on the Eye.

THE Curve of this Cove $x b$ is a Quadrant of a Circle described on the Center e ; as also is the Curve $a c$ of the same Radius described on the Center b . To find the Center b , after having set out the Distances of the Columns at 9 Diameters and a half, and described the Cove $x b$, as aforesaid, make db equal to ad .

A COVE of one fourth, as Fig. A, Plate LXXIX ; is also fit for a lofty Room, as a Hall, Salon, &c. which is thus proportioned : Divide the Height in 20 Parts ; give 5 to the Cove, and 2 to the Entablature.

To describe an Angle-Bracket for any Cove, suppose for Fig. B.

LET abc be a Front-Bracket, and af the Base over which the Angle-Bracket is to stand. In C draw Ordinates from its Curve to its Base an , at any Distances, and continue them till they meet af the Base of the Angle-Bracket, from whence raise Ordinates at right Angles to the said Base ; and making them respectively equal to those in Figure C, through their Extremes trace the Curve ane , which is one Quarter of an Ellipsis, and the Curve of the Angle-Bracket required.

A COVE of one 5th, as Fig. I, Plate LXXIX, is fit for a Room of State, and thus proportioned, *viz.* Divide the Height in 5 ; give 1 to the Cove, and one third of the next to the Cornice, which is *Dorick* without Mutules, and represented at large by Fig. H.

A COVE of one 6th, as the two Coves in Plate LXXX, is fit for Dining-Rooms, &c. and is thus proportioned : Divide the Height in 30 Parts ; give 5 to the Cove, and 1 to the Cornice.

A COVE of two 7ths, as Fig. B, Plate LXXXI, is fit for a Study or Bed-chamber, and even for a Hall ; as herein expressed, and is thus proportioned : Divide the Height in 7 ; give 2 to the Cove, and 1 to the Entablature, which is *Dorick*.

IV. IN Plate LXXVI, I have shewn how to proportion the *Tuscan, Dorick, Ionick, &c.* Cornices to the Height of any Room; a Work known, or at least practised but by few,

I. *To proportion the Tuscan Cornice to a Room of any Height.*

DIVIDE the Height from the Floor or Dado in 5, and the upper 1 in 5; of which give 3 to the Height of the Cornice, and 2 to the Breadth of its Stile and Height of its Rail, Fig. A.

II. *To proportion the Dorick Cornice to a Room of any Height,*
Fig. B.

DIVIDE the Height in 4, and the upper 1 in 10; of which give 3 to the Height of the Cornice, and 2 to the Breadth of its Stile and Height of its Rail.

III. *To proportion the Ionick, Corinthian, or Composite Cornices to the Height of any Room, Fig. C.*

DIVIDE the Height in 3, and the upper 1 in 5; of which give the upper 1 to the Height of the Cornice, and 3 fifths of the next 1 to the Height of the Rail, and to the Breadth of the Stile.

V. IN Plate LXXVII, I have given eight different Mouldings for Pannels; and in Plate LXXVIII, four different Mouldings for Tabernacle-Frames, with proper Enrichments, and their Measures affixed; by which they may be drawn and worked, of any Magnitude required.

VI. IN Plate LXXXII, I have shewn the Manner of finding the Curves of the necessary Ribs for Groins, by one general Rule, as follows.

IN Fig. A, let $abcd$ be the Plan, and the Semi-circle acb an End Rib, and cf its Height. Draw the Diagonal ad , as also the Ordinates $1\ 2\ 3\ 4$, on the Semi-circle Rib, which continue till they meet the Diagonal, in the Points $5\ 6\ 7\ 8$; from whence raise right Lines perpendicular to ad , respectively equal to the Ordinates $1\ 2\ 3\ 4$, and then tracing the Curve thro' their Extremes, it will be the Curve for the Diagonal Rib, as required.

By the same Rule, the Ribs for all other Kinds of regular or irregular Groins are found, be their Plans what they will, and their

their Arches semi-circular, semi-elliptical, or Scheme ; as is evident by Figures B C D E and F ; which a little inspection will make evident to the meanest Capacity.

C H A P. VIII. *Of Trussed Partitions, Trussed Girders, Naked Flooring, &c.*

I. **I**N Plate LXXXIII, are three Varieties of Trussed Partitions, of 40, 50, and 60 Feet Bearing, for Graineries, Ware-houses, &c. wherein great Weights are laid ; of which the middle one is for two Stories Height.

II. In Plate LXXXIV, the Figures A B C represent three Varieties of trussed Girders ; which ought not to exceed 25 or 30 Feet in Length ; and Figure D is a Girder cut Camber, which, for Lengths from 15 to 20 Feet, will do without being trussed, as the preceding.

The Scantlings of Girders should be

	Feet.		Feet.		Inches.
Lengths from	12	to	15	to be	10
	15		18		11
	18		21		12
	21		24		13
	24		27		14
	27		30		15
					by
					8
					9
					10
					11
					12
					13

Note, THAT Girders should have at least 9 Inches Bearing in the Walls, and be bedded on Lintels, laid in Loam, with Arches turned over their Ends, that they may be renewed at any Time without Damage to the Pier.

III. In the upper Part of this Plate, I have shewn three Bays of Joists, or naked Flooring ; wherein the two outer ones have only their binding Joists expressed ; and that in the Middle with their Bridging Joists, (or Furring Joists) as called by some. In this kind of Flooring 'tis to be noted, that binding Joists are so framed as that their

their under Surface be level with the under Surface of the Girder, and the upper Surface of their Bridgings with the under Surface of the Girder.

THE Distance of binding Joists should not exceed 3 Feet and a half, or 4 Feet, in the Clear; and their Scantlings should be as follows, viz.

	Feet.		Inches.			
If their	$\left\{ \begin{array}{c} 8 \\ 10 \\ 12 \end{array} \right\}$	their Scantlings	$\left\{ \begin{array}{c} 6 \\ 7 \\ 8 \end{array} \right\}$	by	$\left\{ \begin{array}{c} 5 \\ 5 \\ 5 \end{array} \right\}$ Inches.	
Length be						should be

BRIDGING Joists should be laid at 1 Foot in the Clear, and their Scantlings should be 3 by 4, 3 and a half by 4, or 4 by 4, &c.

IN common Flooring, where neither Binding nor Bridging Joists are used, the Scantlings of Joists ought to be as follows, viz.

	Feet.		
If the Length be	$\left\{ \begin{array}{c} 10 \\ 11 \\ 12 \end{array} \right\}$	their Scantlings to be	$\left\{ \begin{array}{c} 7 \\ 8 \\ 9 \end{array} \right\}$ by $\left\{ \begin{array}{c} 3 \\ 3 \\ 3 \end{array} \right\}$

Note, No Joists to exceed 12 Feet in Length; to have at least six Inches Bearing, and that on a Lintel or Bond Timber; and their Distance in the Clear not to exceed one Foot. 'Tis also to be observed, that all Joists on the Breasts and Backs of Chimneys be framed into Trimming Joists (whose Scantlings are to be the same as those of Binding Joists) at 6 or 8 Inches Distance behind, and 12, 16, &c. Inches before, as a a.

CHAP. IX. Of Roofs.

THE Requisites to Roofing, is the Scarfing and Completing of Raifings, or Wall-plates, &c. to determine the necessary Height of the Pitch, agreeable to the Covering; to find the Lengths of Principal and Hip-Rafters, and to back them when necessary; to

to contrive the proper Trusses for to strengthen the principal Rafters; and to lay out in Ledge ment the several Skirts; thereby to determine the Quantity of Materials necessary; and to find the several Angles and Lengths of all Parts; so as to set out Work, and fix, at once, the Whole in a Workman-like Manner, and in the least Time.

Now, in order to make the young Student a Master, herein I have shewn,

I. IN Plate LXXXV, by Figures C D E F G H I K L M ten different Manners of Scarfing together the Raifings of Roofs; which is the first Work to be done, and then the Beams being cogg'd down thereon at their proper Distances, which should never exceed 10 Feet in the Clear, we may begin to consider, and work the Superstructure to be raised thereon.

THE first Thing to be considered as the Height of the Pitch; which must be determined according to the Covering; which, if with plain Tile or Slate, the true Pitch, as Fig. A, will be proper: But if with Pan-tiles or Lead, it may be much lower. But here, for Example's Sake, we will suppose a Roof to be true Pitch, whose Plan is $r v t b$, Fig. B, and whose Breadth we will suppose is equal to $g 4$, Fig. A.

To find the Length of a principal Rafter.

DIVIDE $g 4$, in 4 Parts; on g and 4, with the Radius of 3 Parts make the Section b ; then draw the Lines $g b$, and $b 4$; and each is the Length of a principal Rafter required.

To find the Length of the Hip-Rafters.

DRAW the Central Line $o a$, and the Diagonals or Bases, over which the Hip Rafters are to stand; as $r a$, $t a$, $a v$, and $a b$; make $a t$, $a b$, and $a r$, in Fig. A, equal to $a t$, $a b$, and $a r$, in Fig. B, and draw the Lines $b t$, $b b$, and $b r$; then $b r$ is the Length of the Hip-Rafter $r p$; $b b$ is the Length of the Hip $g b$; and $q v$ and $b t$ is the Length of the Hip $t s$.

OR otherwise, on the End of the Diagonal $r a$, raise the Perpendicular $a q$ equal in height to $b a$ in Fig. A, and draw the Line $r p$, which

which is the Length of that Hip, and equal to br , in Fig. A, as before. By the same Rule you may find the lengths of all the other three Hips.

To find the Angle of the Back of any Hip-Rafter.

THROUGH any Point of its Base, as c in Fig. B, draw a right Line at right Angles, as fb , cutting the Out-lines of the Plan in f and b . From the Point c , let fall a Perpendicular, as cd , on the Hip gb ; and make ce equal to cd . Draw the Lines fe , and be , and the Angle bef is the Angle of the Back required.

To lay out a Roof in Ledgement. Plate LXXXVI.

LET $bidc$ be a given Plan; ab , Fig. B, the given Pitch; and bg, be , a Pair of principal Rafters agreeable thereto.

By the preceding, draw the Ridge-Line aa , and the Diagonals ad, ac , and ab, ai . In Fig. B, make ac, ad , and ab equal to the Diagonals aa, ac , and ab, ai , in Fig. A. Thro' the Points aa , in Fig. A, draw the two beans qk , and $e4$. Make rq , and fe , and $kl, 4m$, each equal to the Length of a principal Rafter, as bg , Fig. B; and draw the Lines ds, sr, rb , and il, lm, mc . On the Points B and i , in Fig. A, with the Radius bb (the Length of the Hip) make the Section t , and draw the Lines bt and ti .

ON the Point d , in Fig. B, with the Length bd , in Fig. B, and on c with the Length bc , make the Section o ; then drawing the Lines do and co , the Skirts of the whole Roof are laid; which fill up with small and Jack Rafters at Pleasure.

Now, when the Skirts of a Roof are thus drawn on Paper, and are cut out round at their Extremes, and be truly bended or turned up on the Out-lines of the Rafting, as bi, bd, dc , and ci ; they will all come truly together, and become a Model of the Roof required, wherein every Rafter may be expressed in its Place, and the just Lengths and Quantity known to a very great Exactness.

By the same Rule, the irregular Roof, Plate LXXXVII, is laid out in Ledgement, and its Requisites found, as is evident at the first view.

Note,

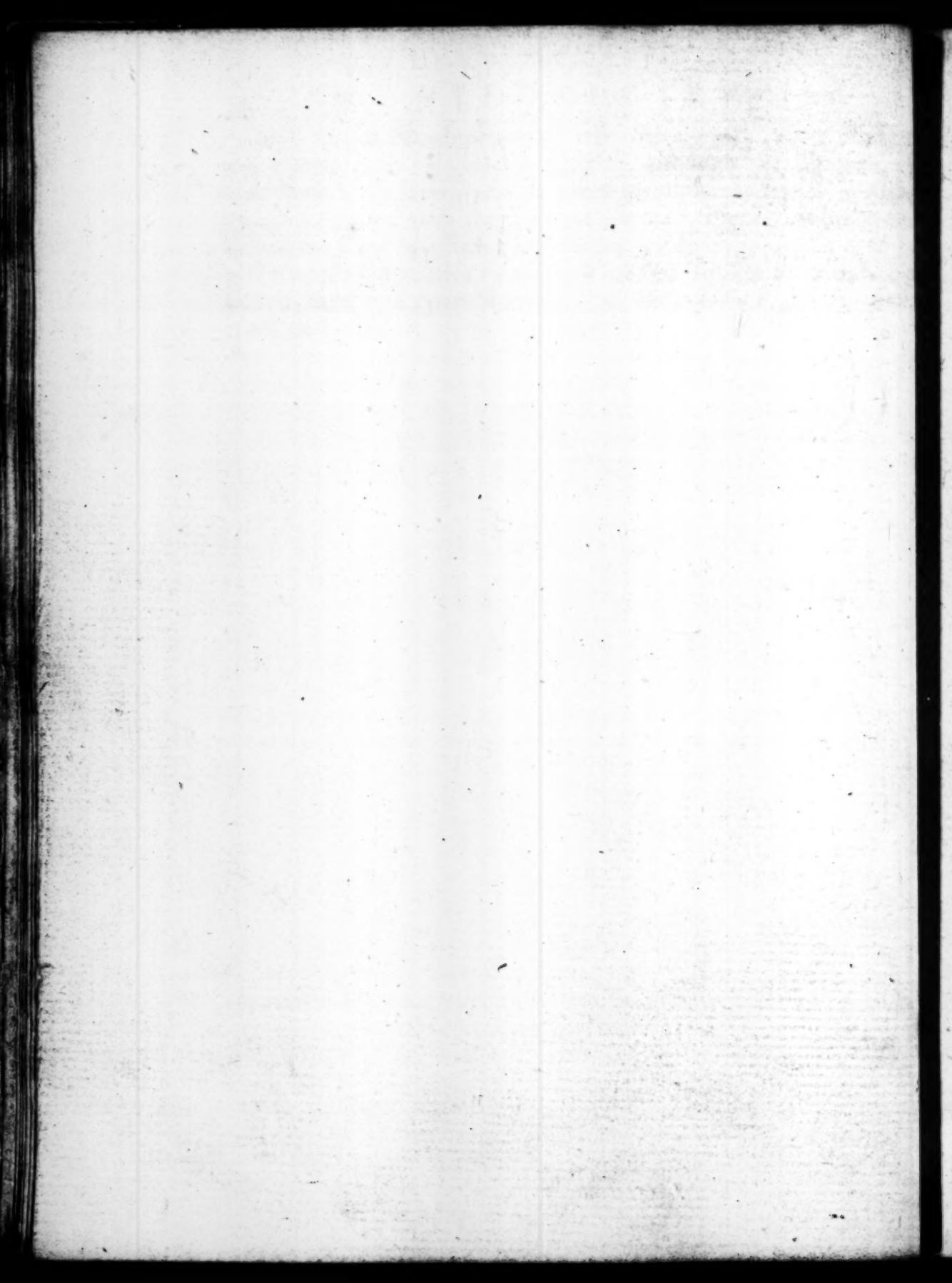
34 The BUILDER'S JEWEL.

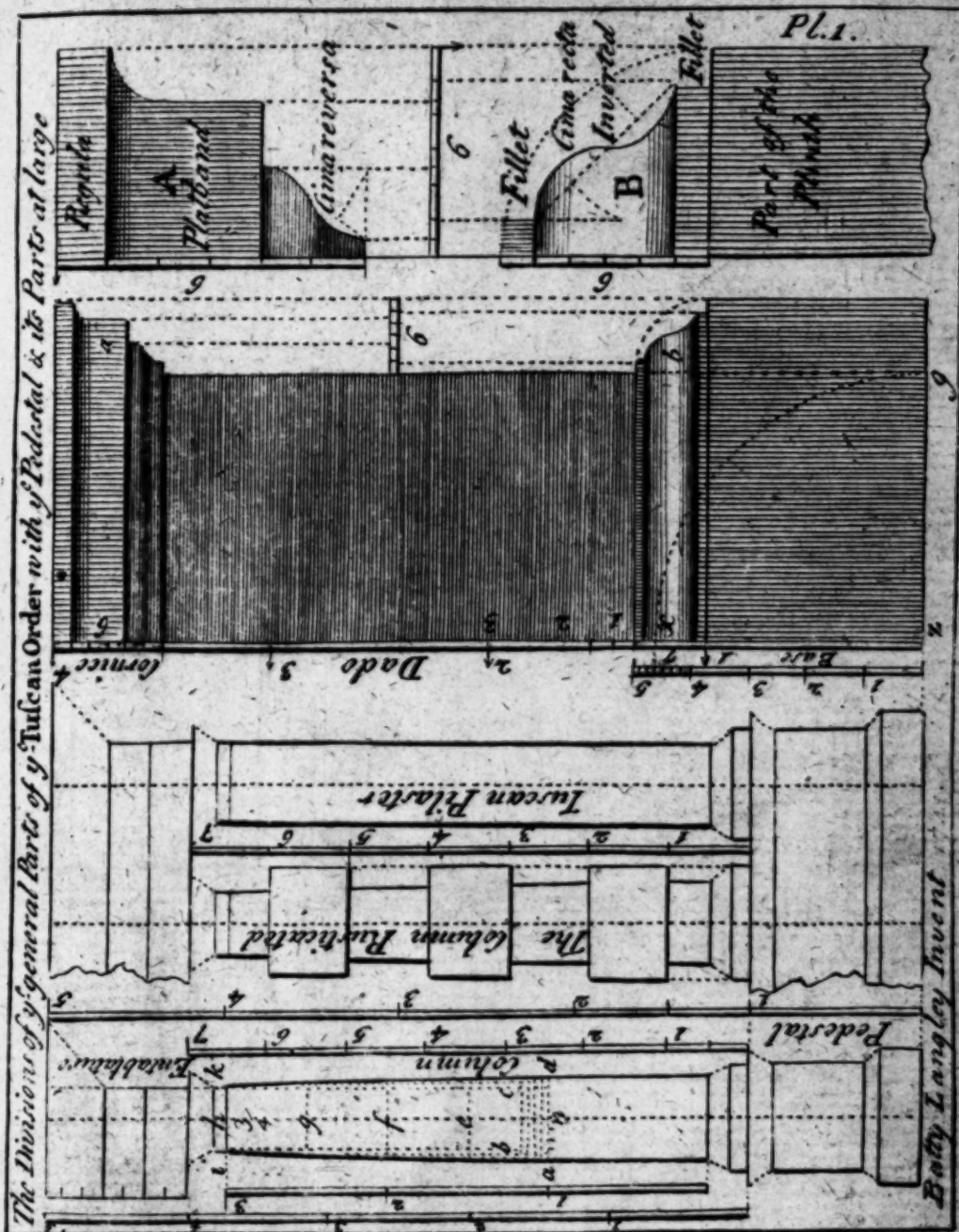
Note, As this Plan hath not parrallel Sides, every Pair of Rafter will therefore be of different Lengths, although the Heighth of their Pitch is the same; and so consequently every Rafter must be backed by taking away the Triangle; as aeb , Fig. D, and then the Sole of the Foot of a Rafter will be as $cadb$.

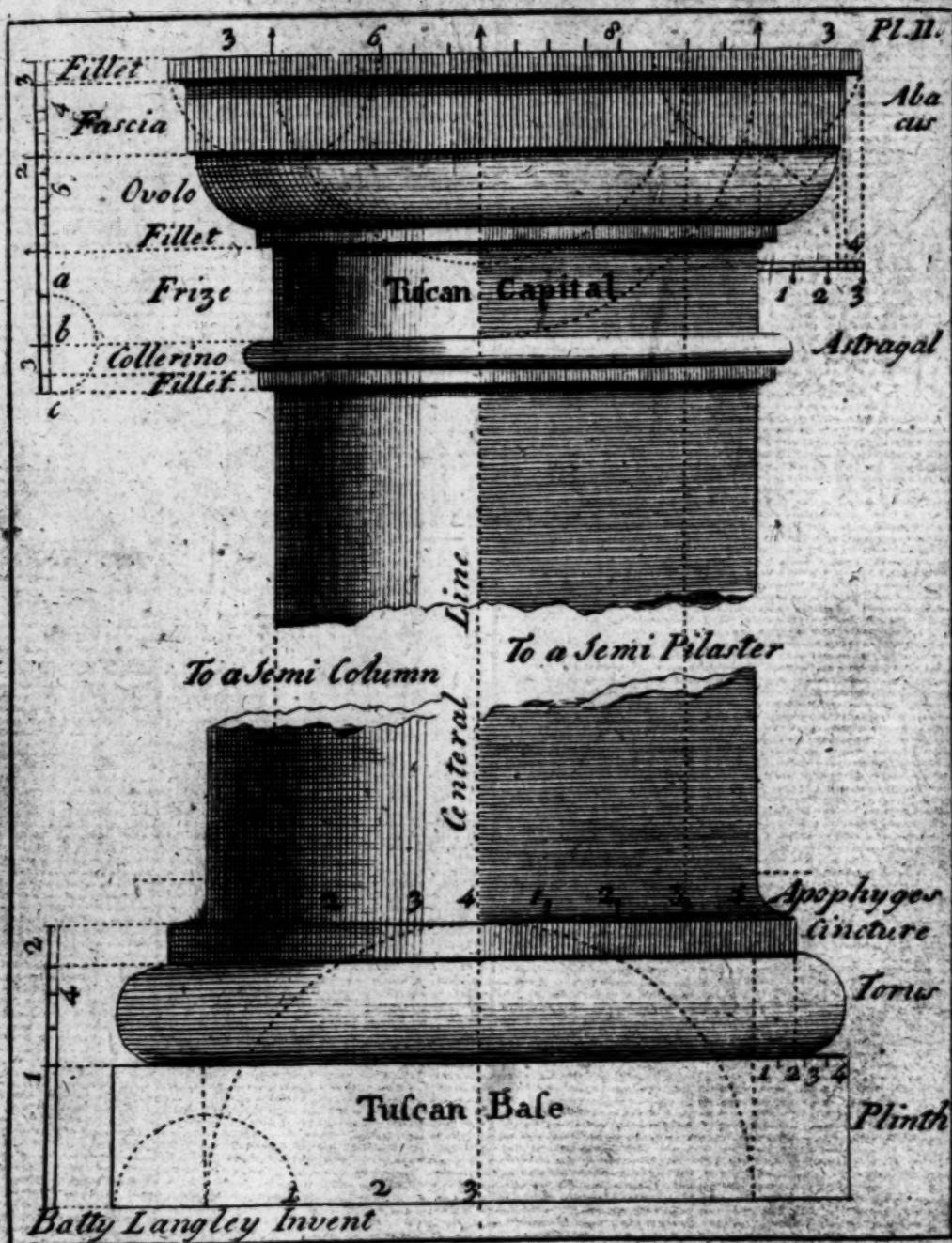
THE following Plates consiſting wholly of Trusses for Roofs and Domes, need no Explanation more than their own Figures expreſs, to which I refer.

F I N I S

ers
of
be
he
and
efs,

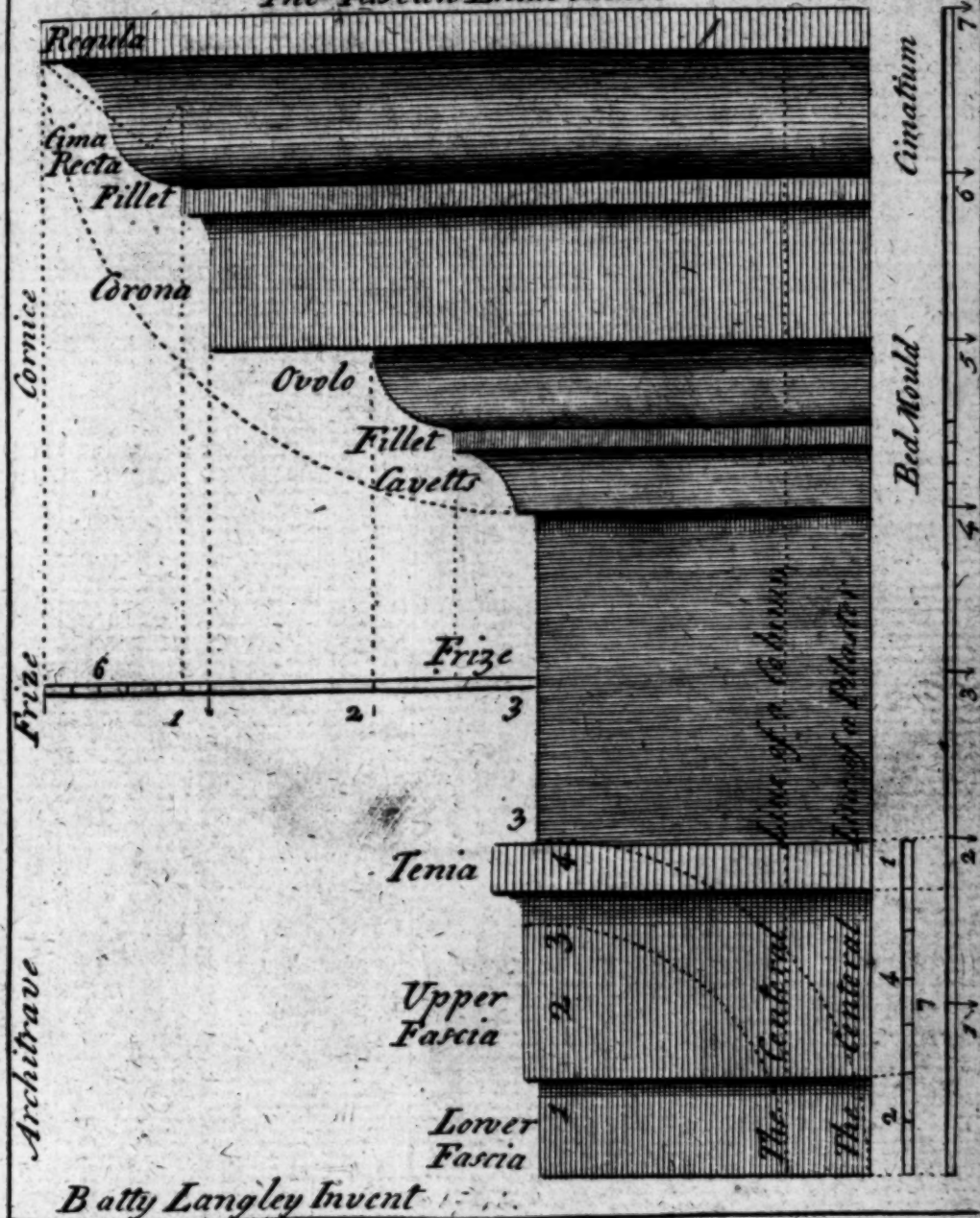






The Tuscan Entablature

Pl. III



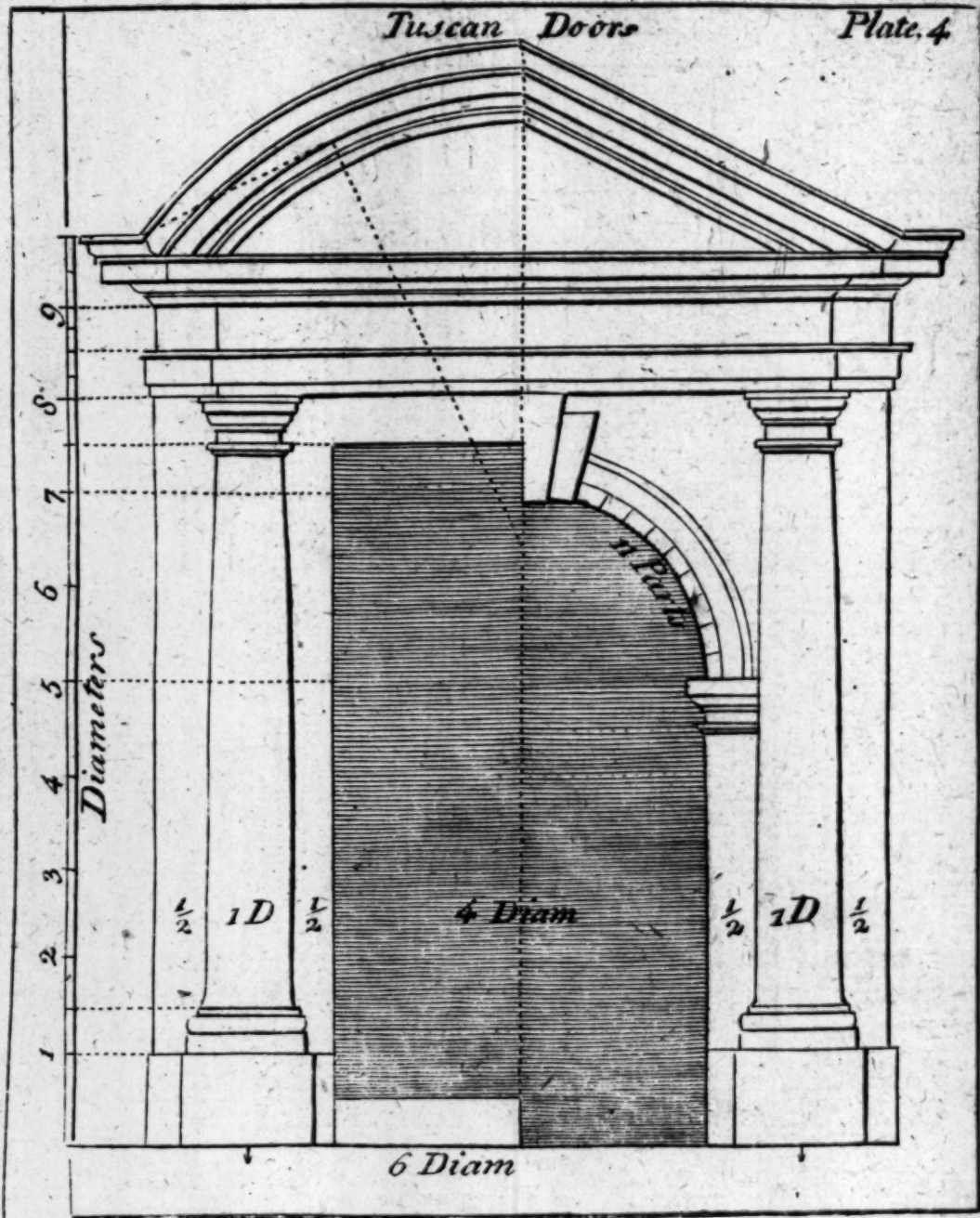


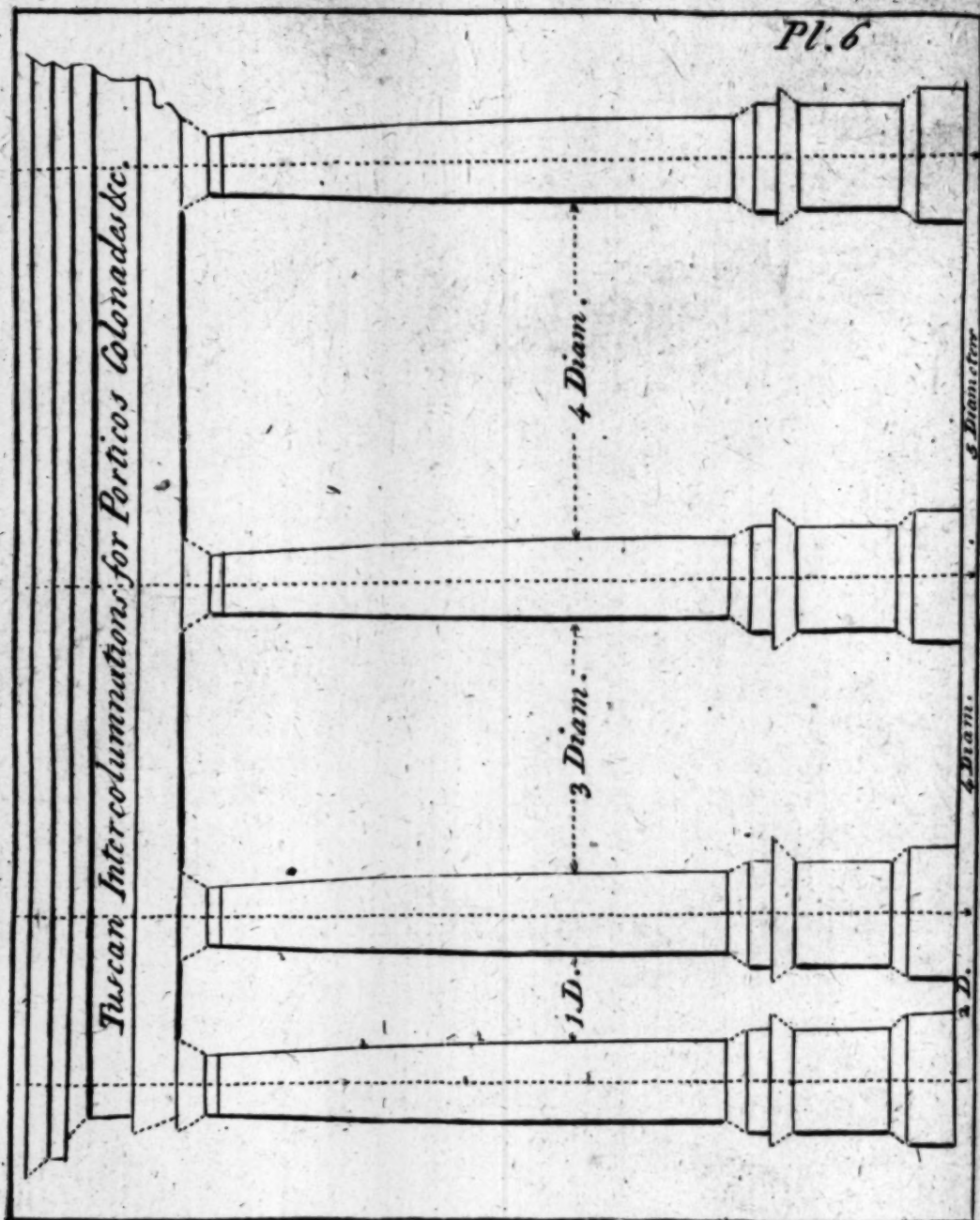
Plate 3.

Tuscan Window



B

Tuscan Inter-columniations for Porticos Colonnades

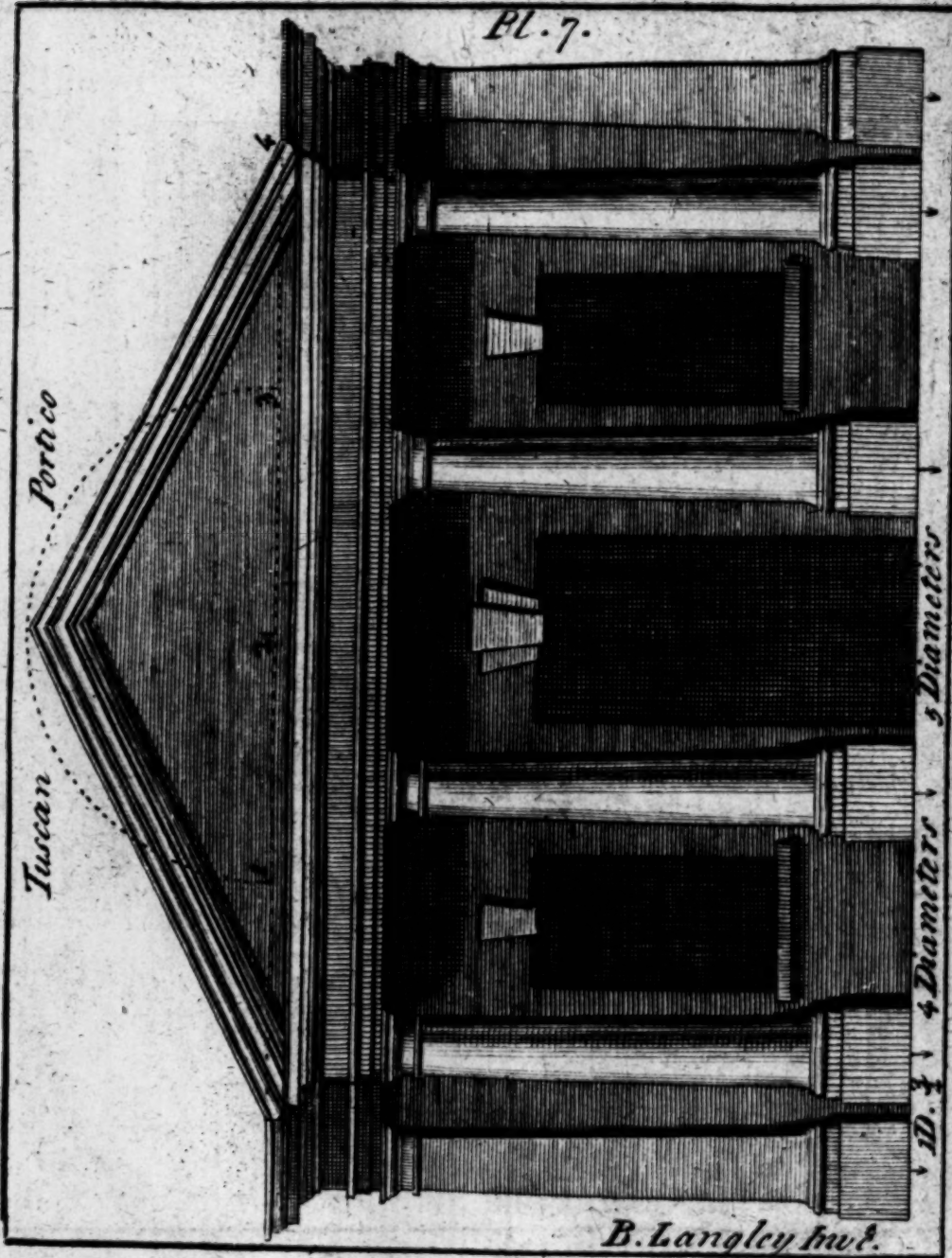


3 Diameter

4 Diam.

2 D.

Pl. 7.

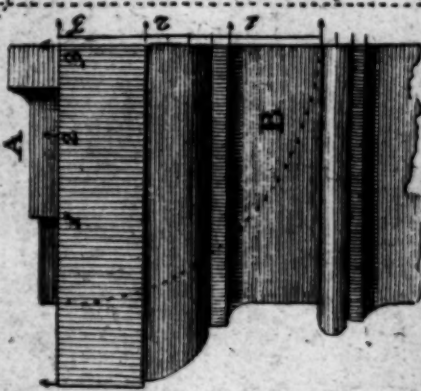
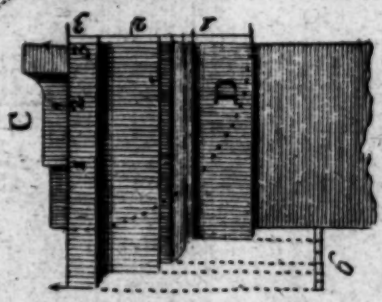
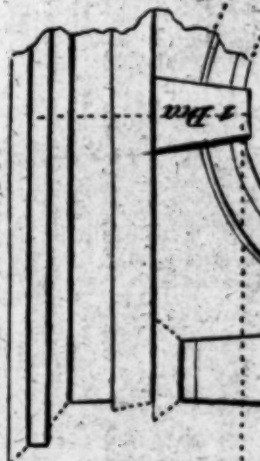


B. Langley invt.

C

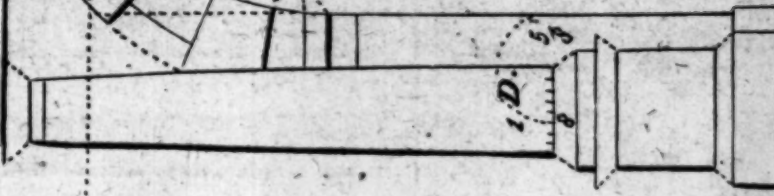
Tuscan Arches with their Imports and Architraves

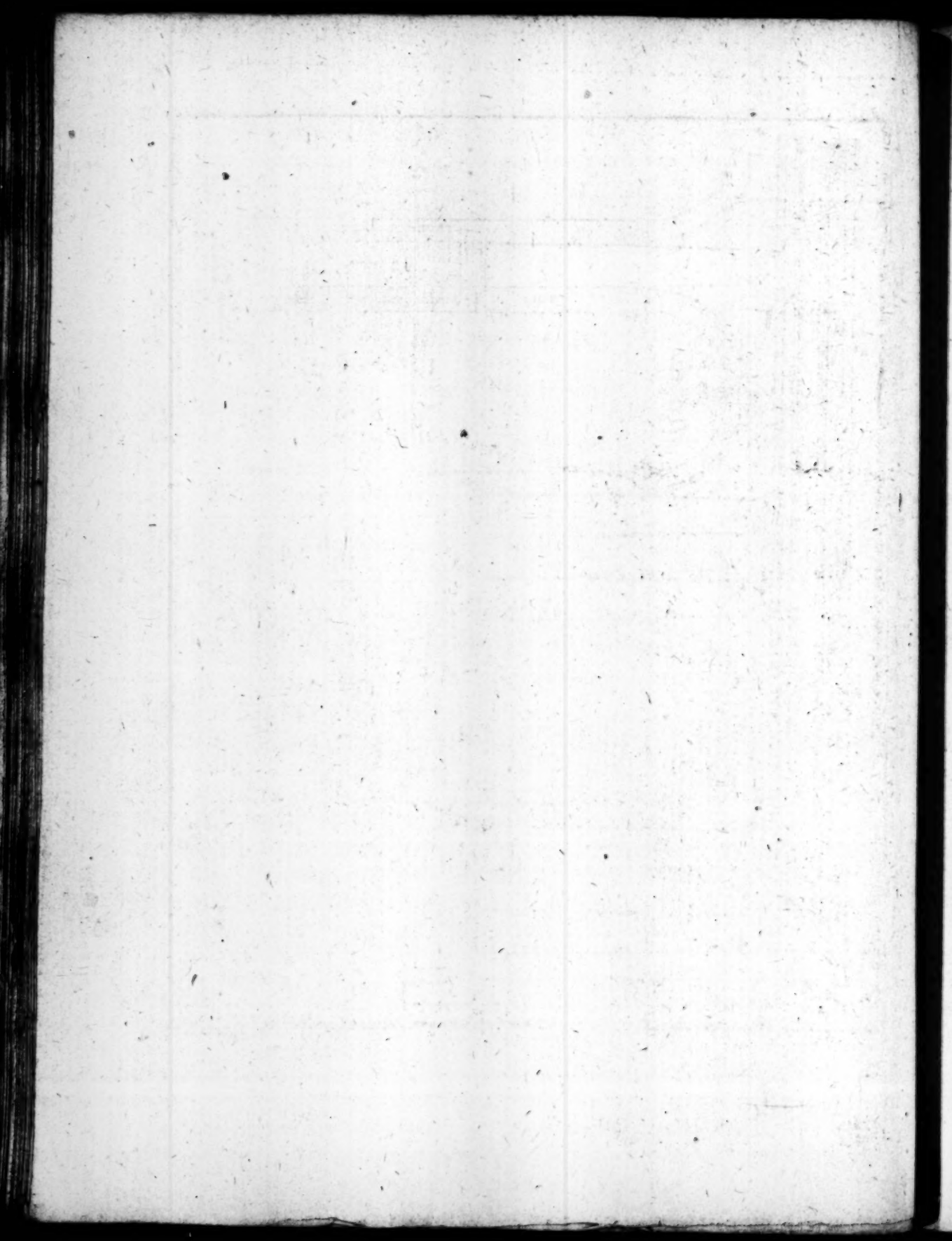
Pl 8



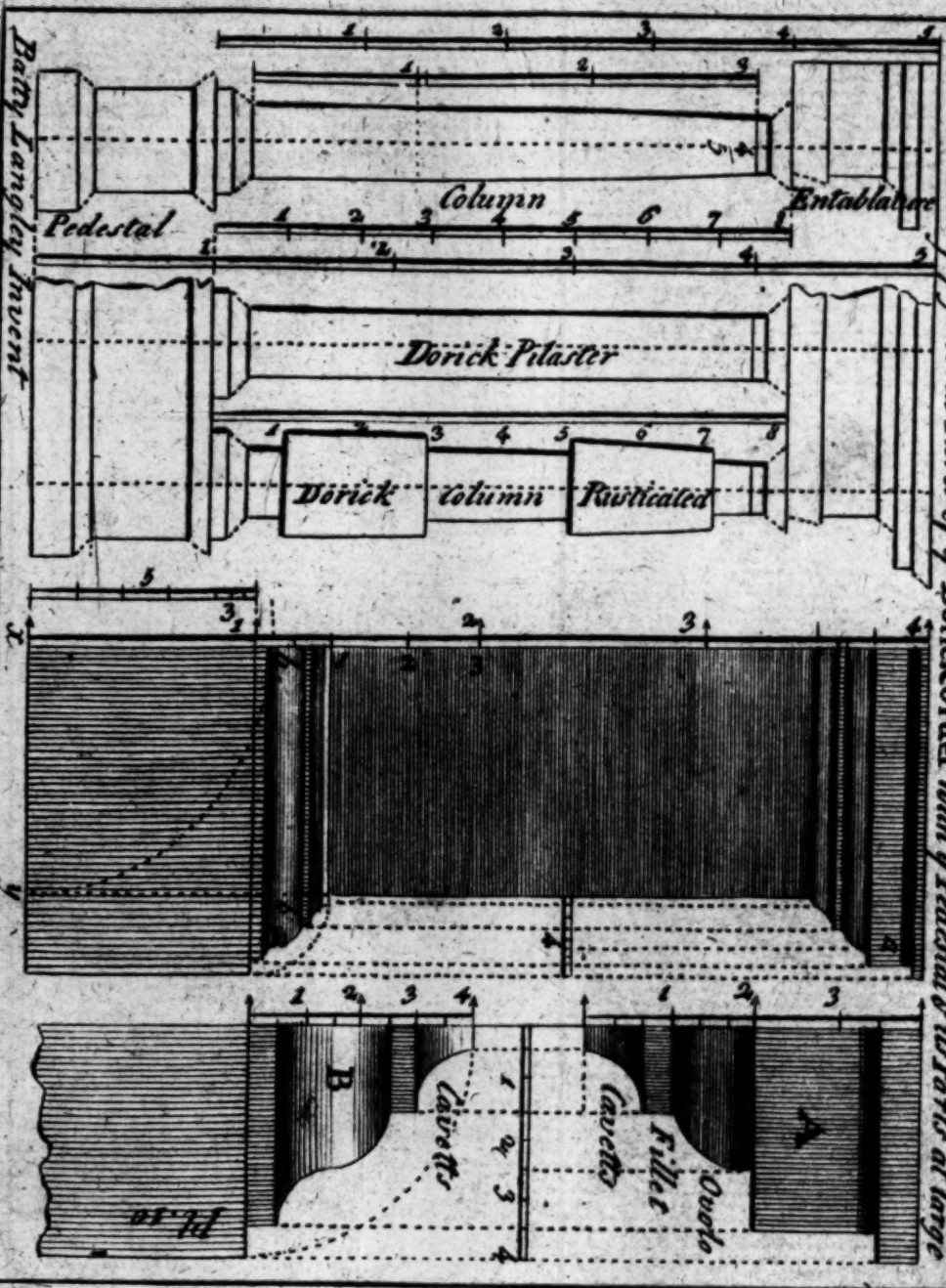
4 Diameters

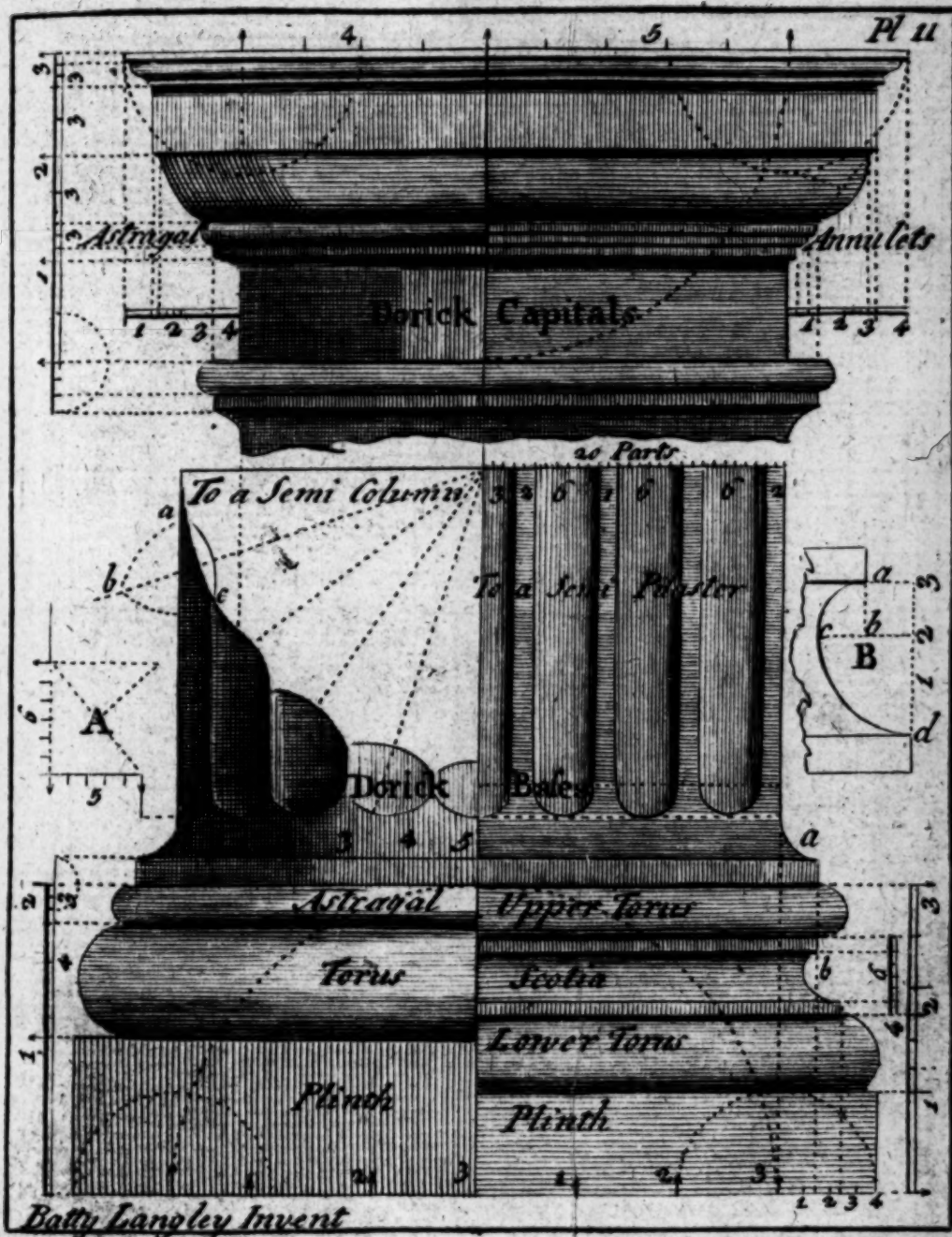
5 Diameters





The Divisions of y^e general Parts of y^e Dorick Order with y^e Pedestal & its Parts at large



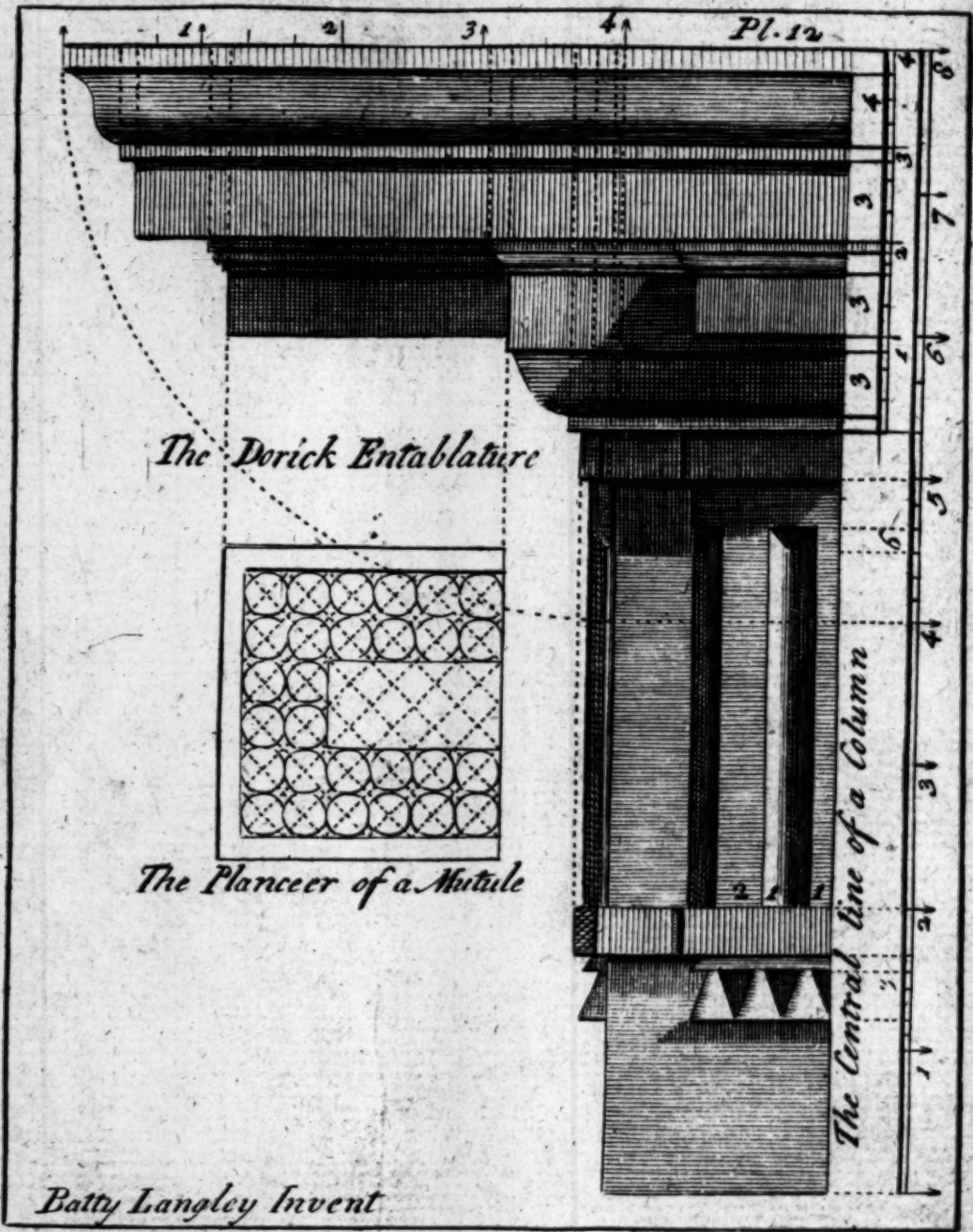


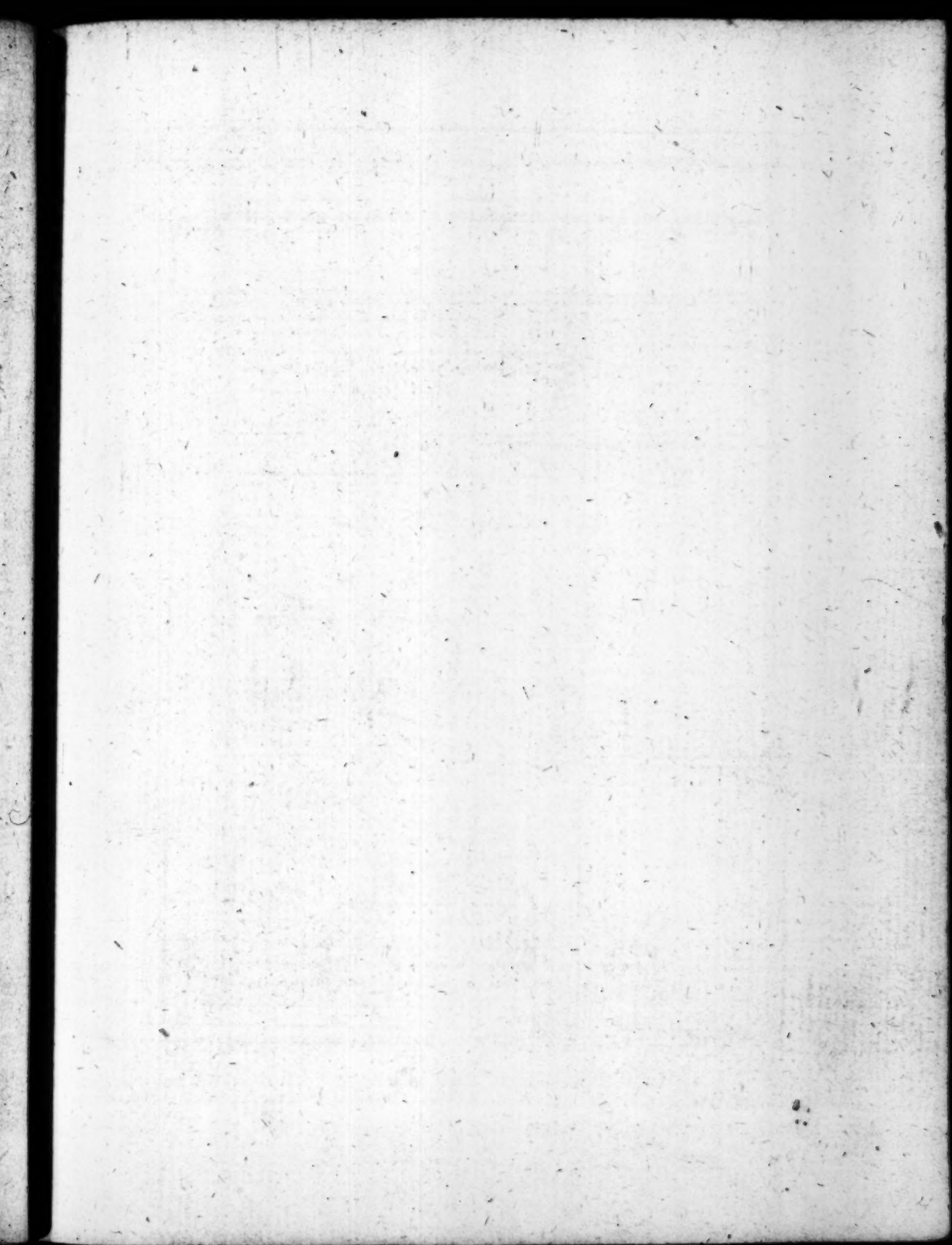
The Dorick Entablature

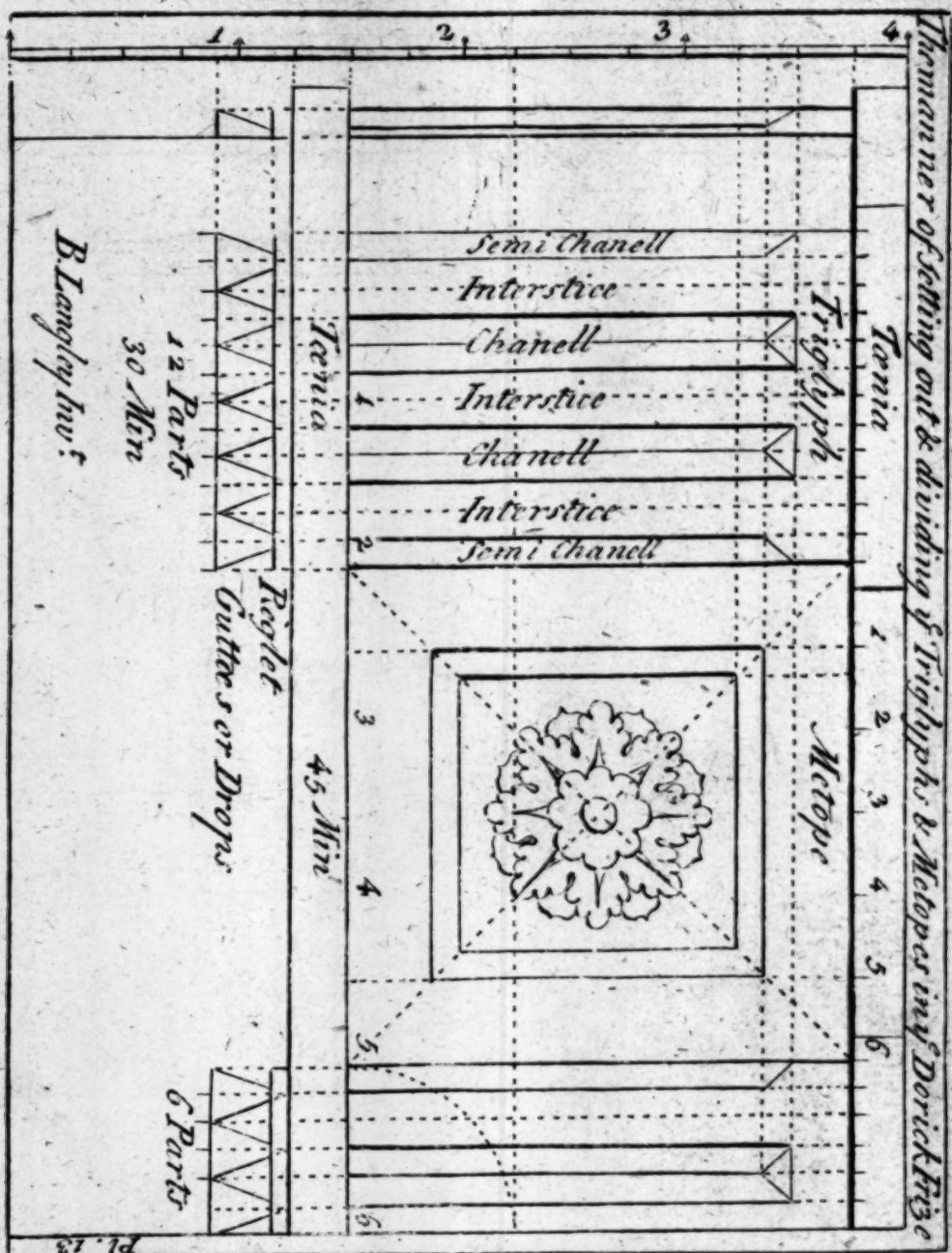
The Planceer of a Mutule

The Central Line of a Column

Batty Langley Invent







Mutule

$\frac{1}{2}$ Mutule

The Planceer of the Dorick
Cornice at an external
Angle Vide Plate XII

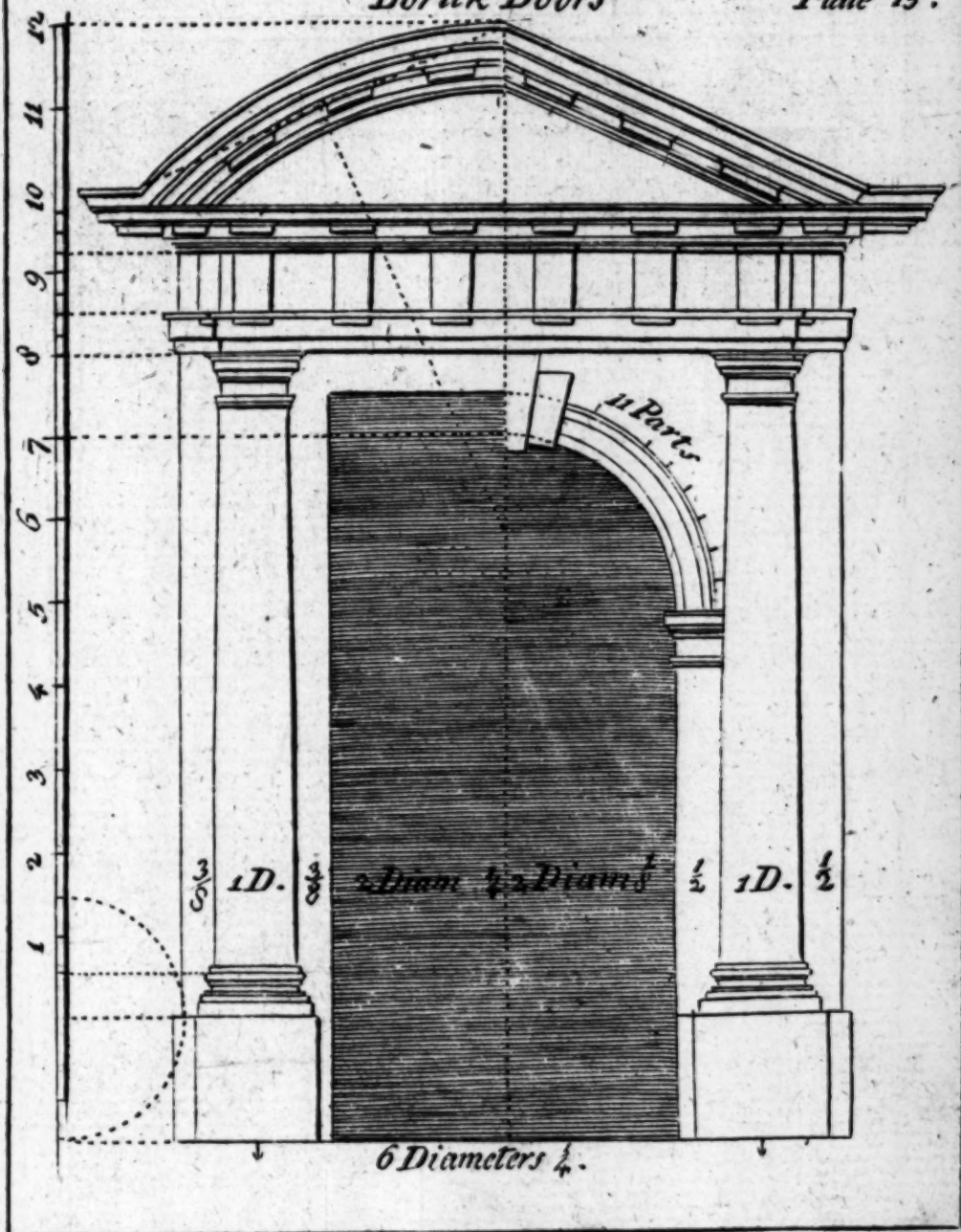


1 2 3 4

B. Langley Inv^t

Dorick Doors

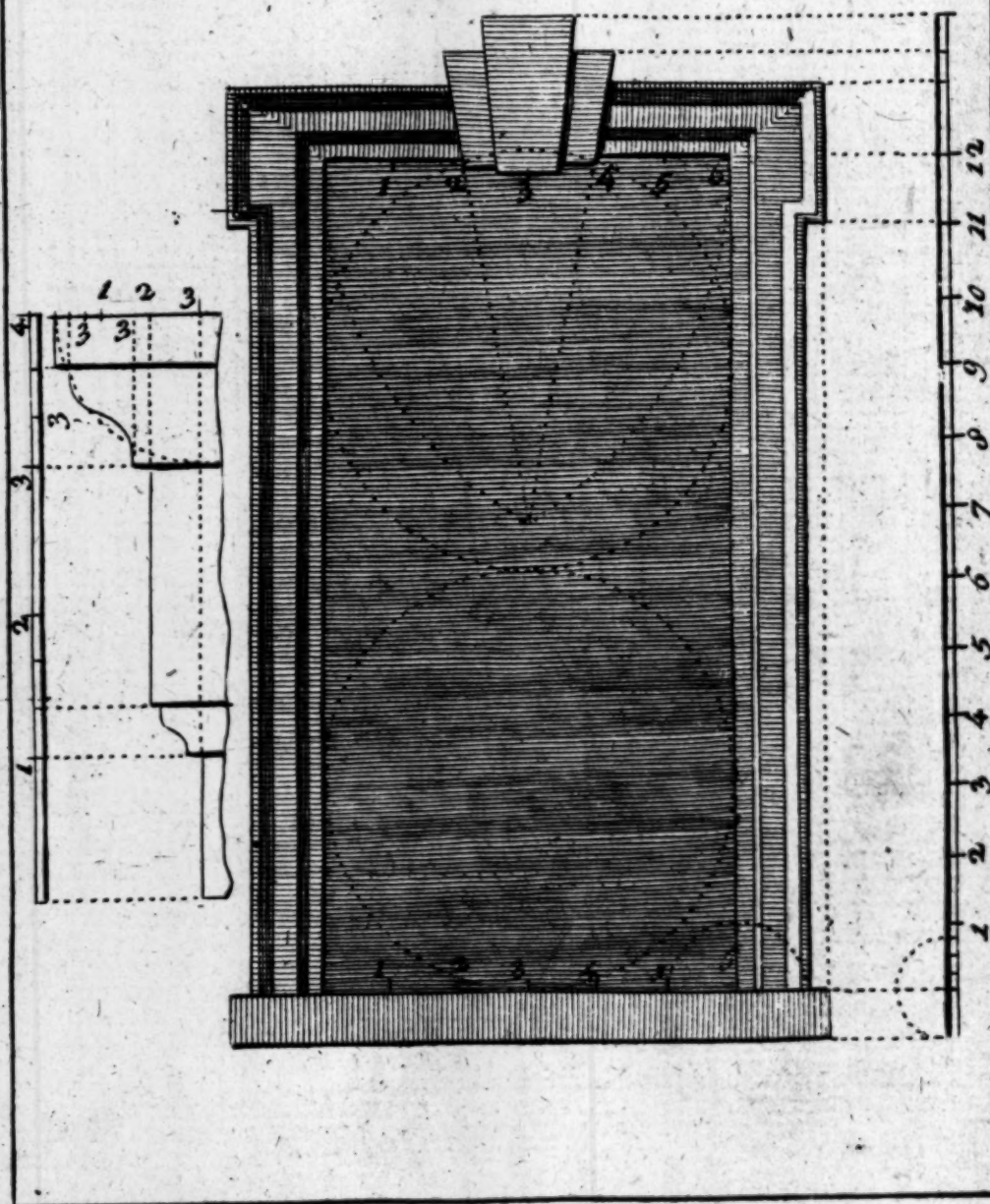
Plate 15.



F

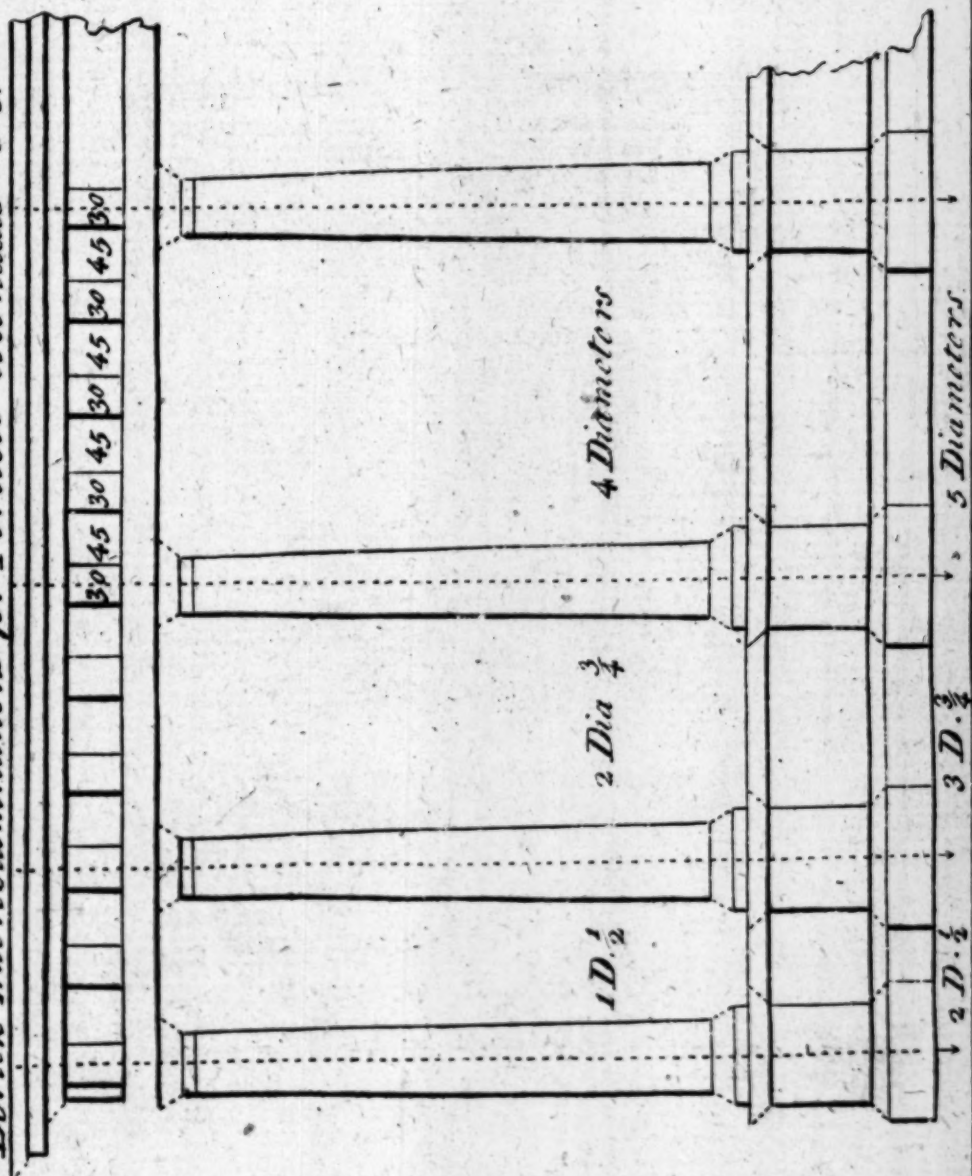
Dorick Window

Plate 16.

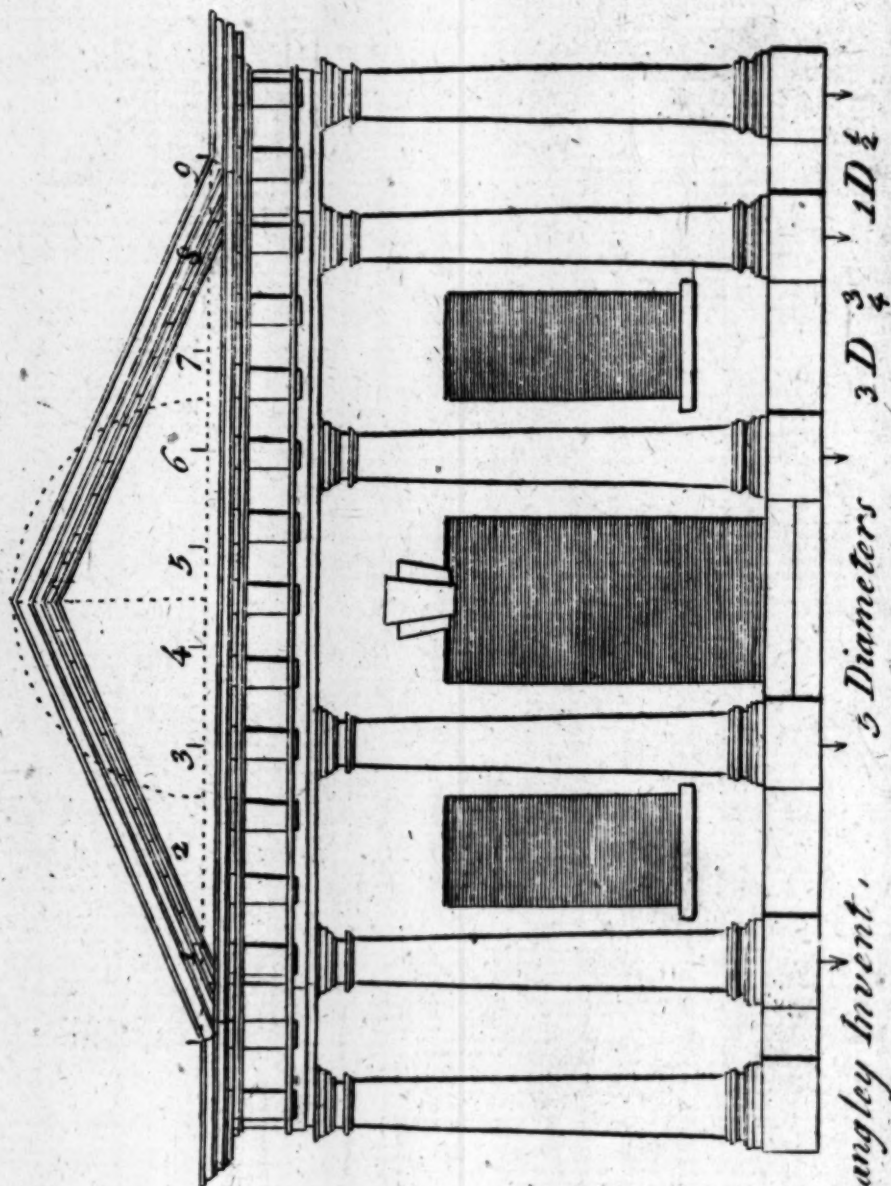


Doric Intercolumnations for Porticos Colonnades &c.

Pl. 17



Dorick Portico



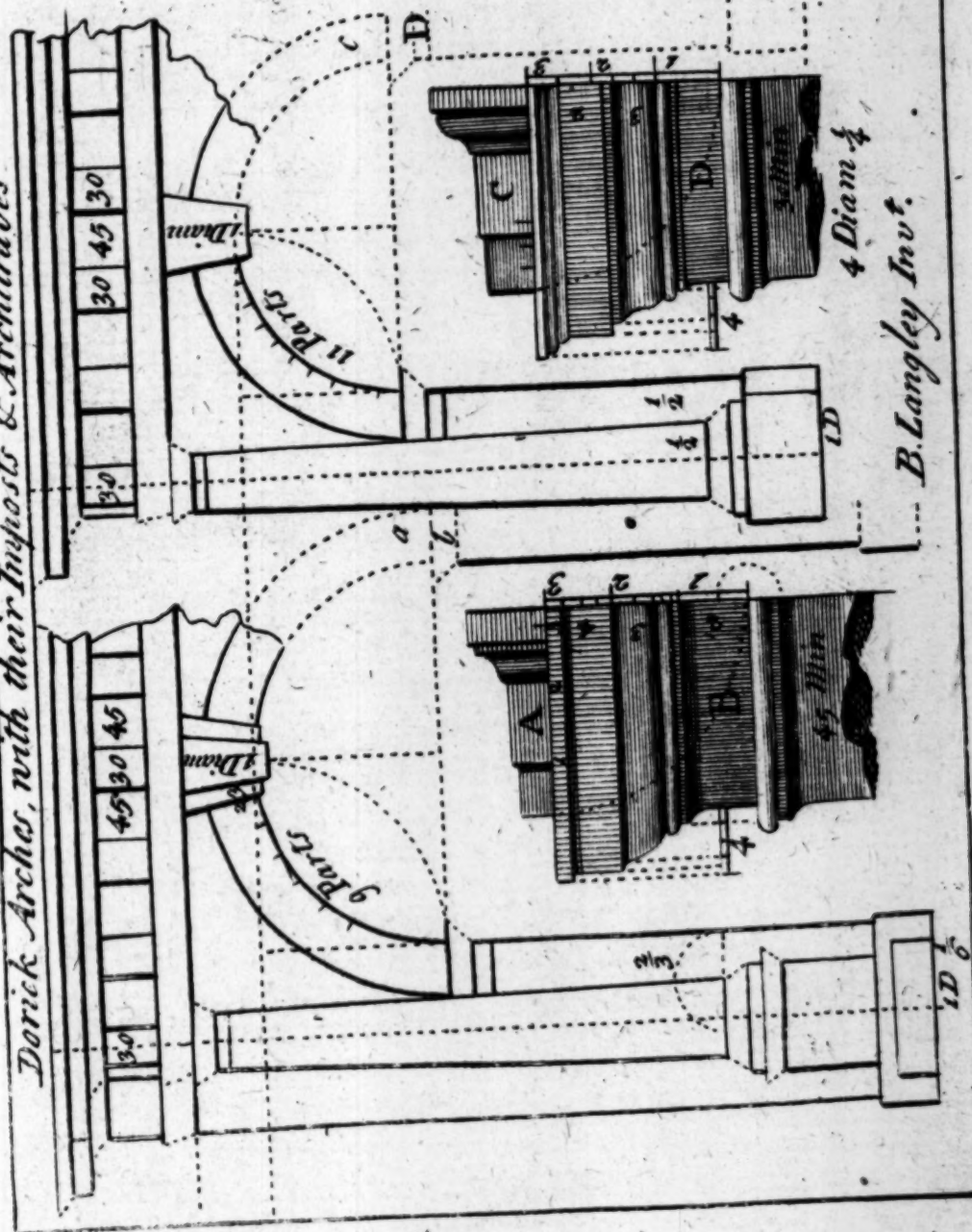
B Langley Invent.

5 Diameters

3 D $\frac{3}{4}$

1 D $\frac{1}{2}$

Dorick Arches, with their Imposts & Architraves

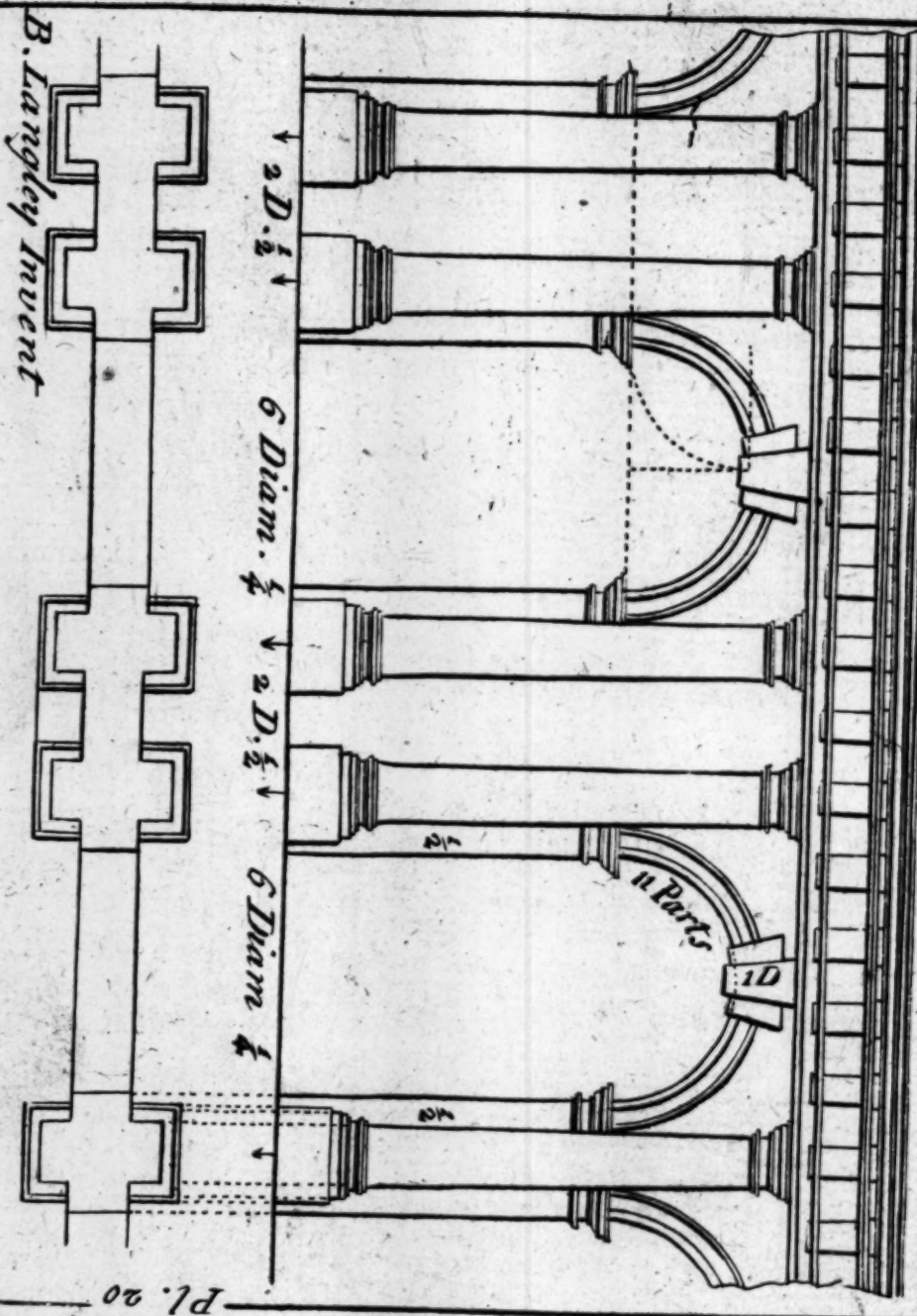


4 Diam $\frac{1}{4}$

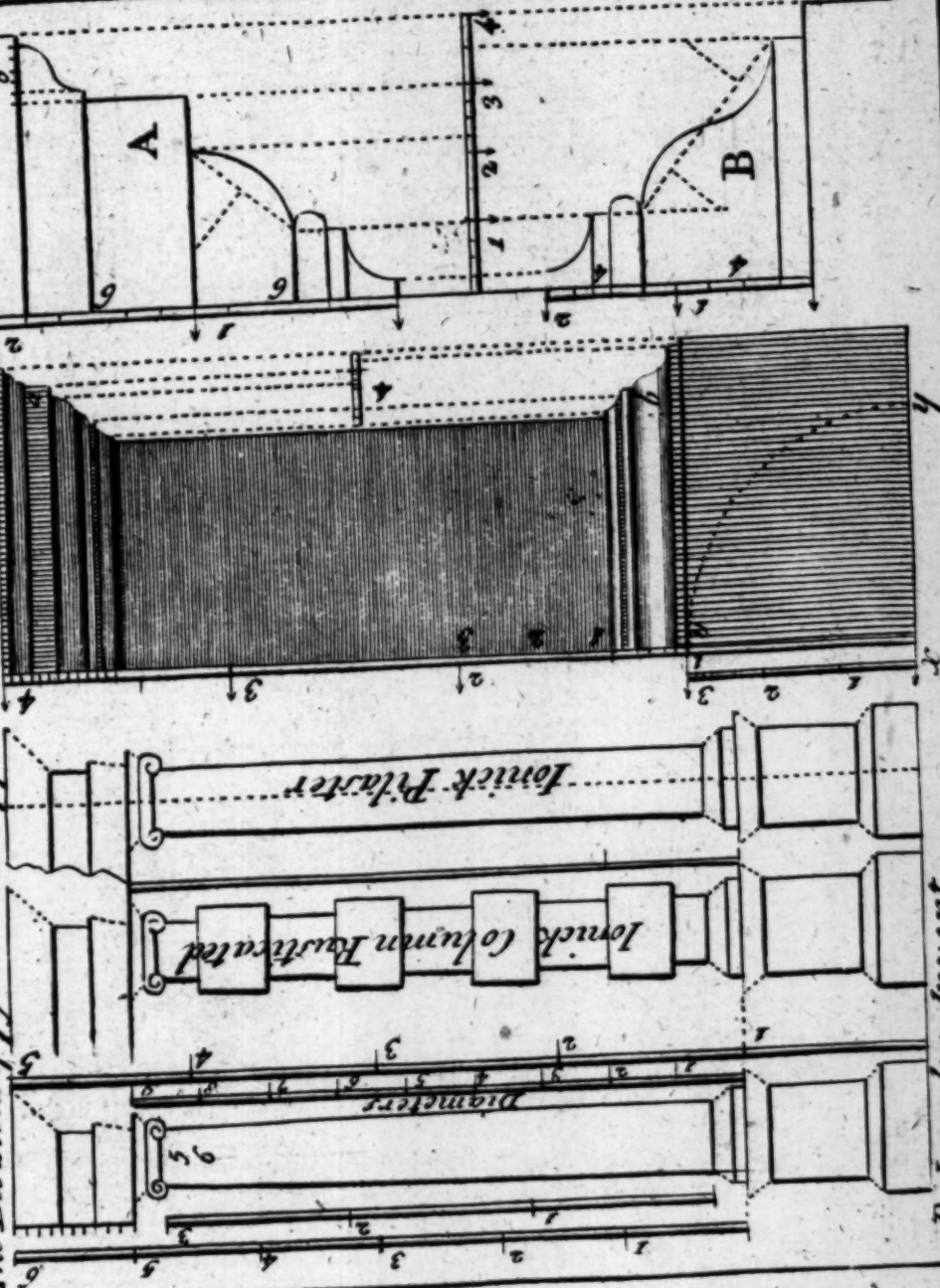
B. Langley Inv^t.

G

Doric Arcades

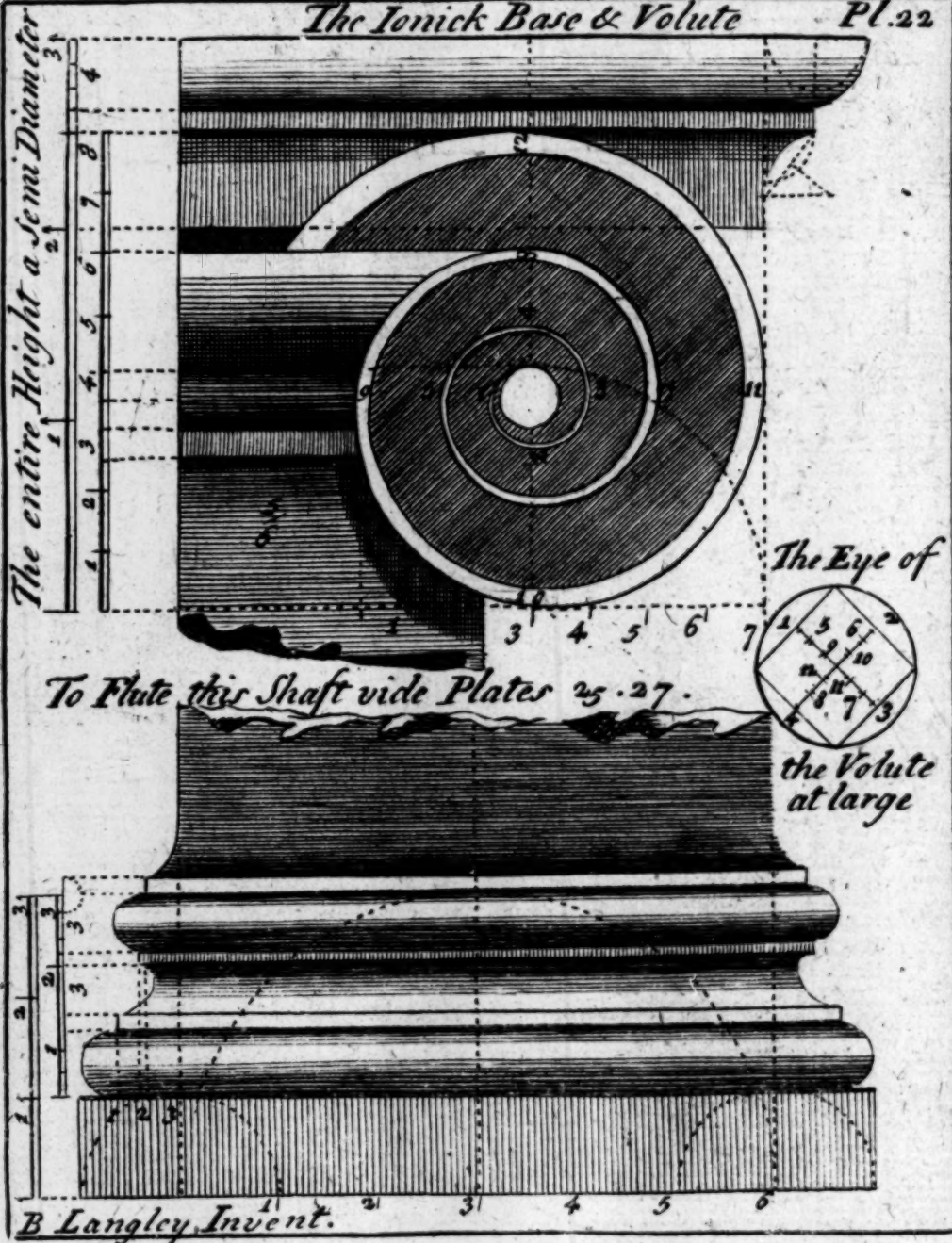


The Divisions of the general Parts of the Ionic Order wth of Pedestal & its Parts at large

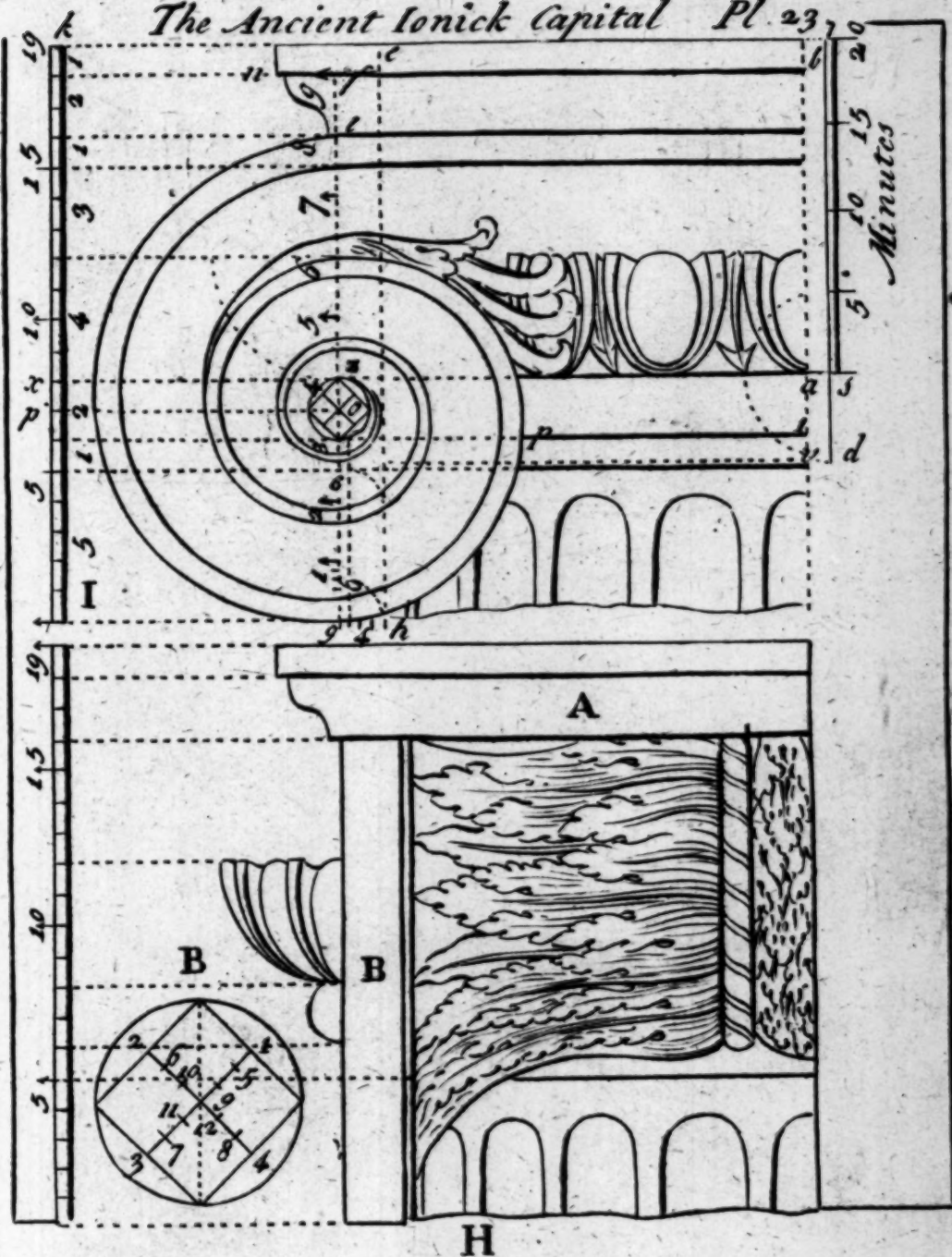


Pl. 21.

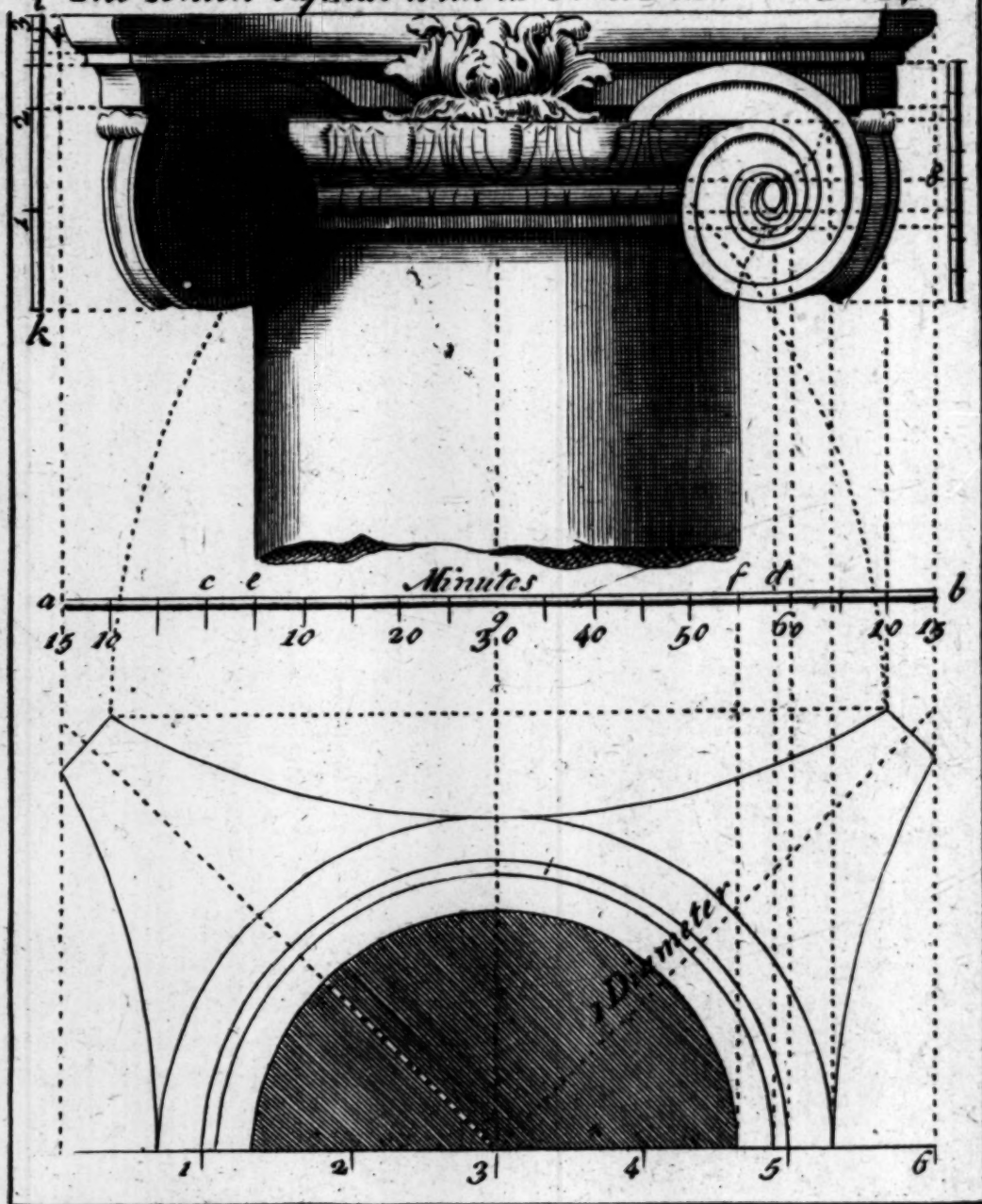
B Langley Invent



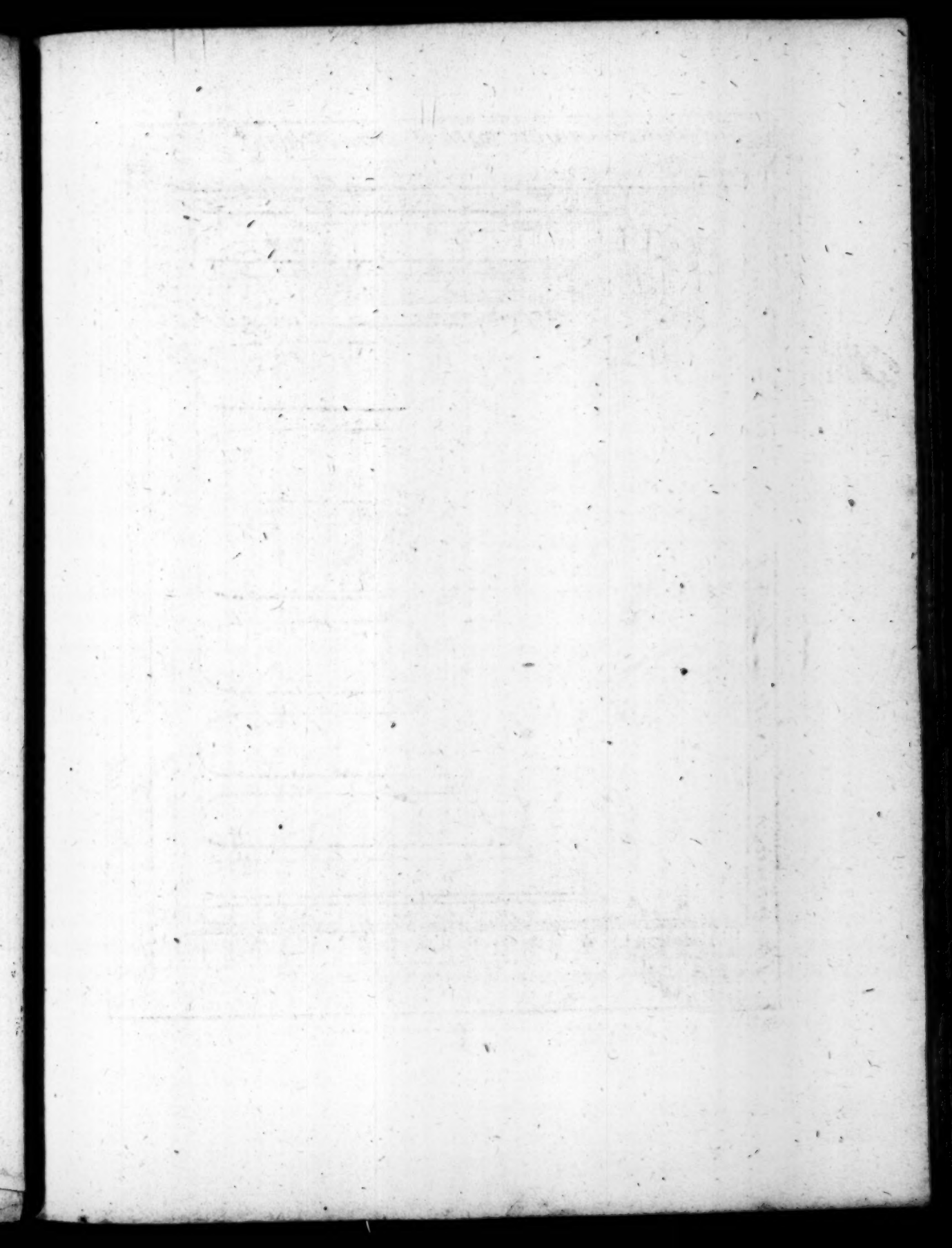
The Ancient Ionick Capital Pl 23



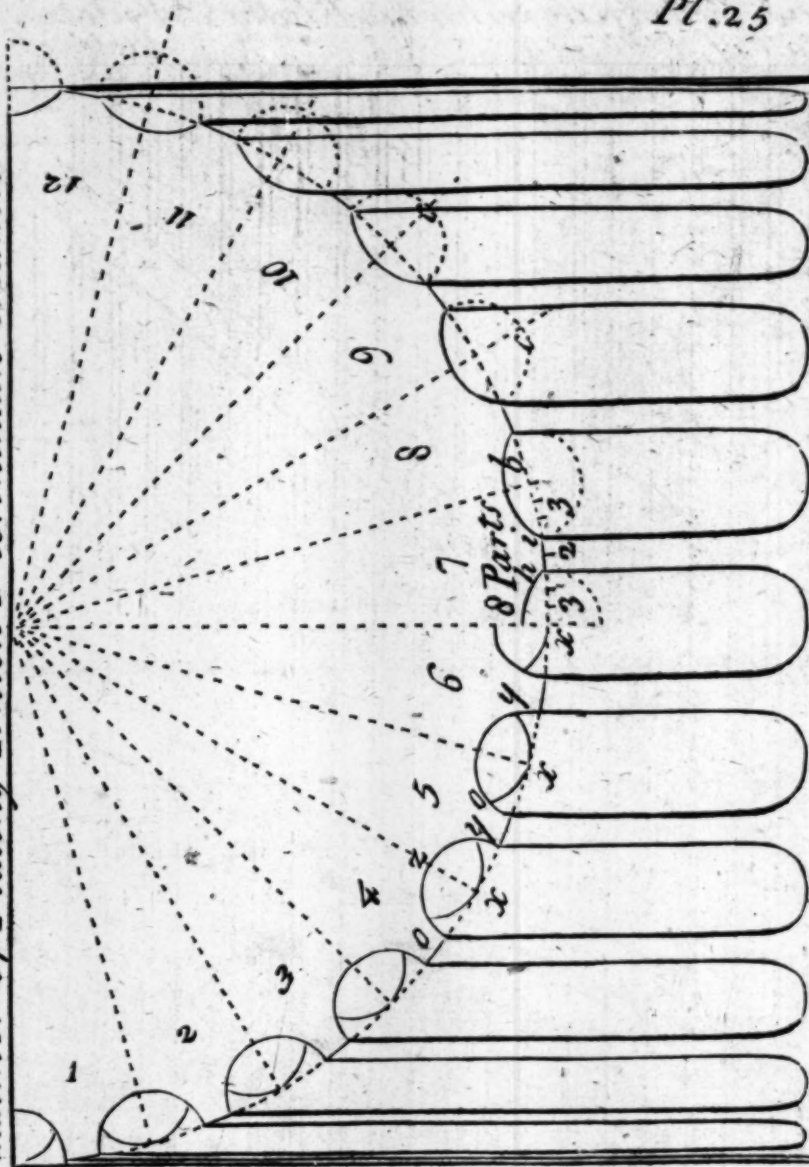
The Ionick Capital with its Semi Plan Pl. 24



Batty Langley Inv.

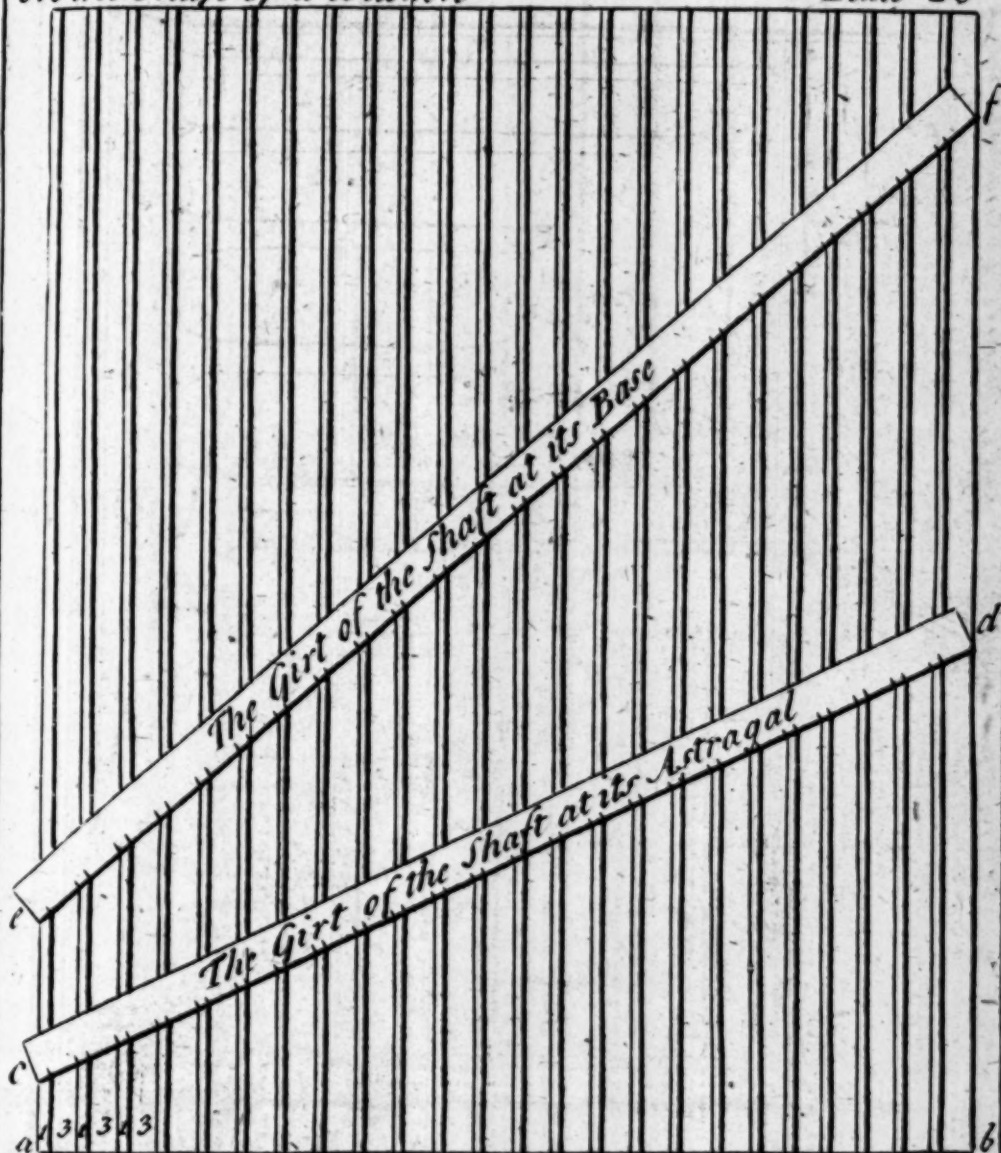


The manner of Fluting Ionic & Corinthian Columns



Blangley Invent

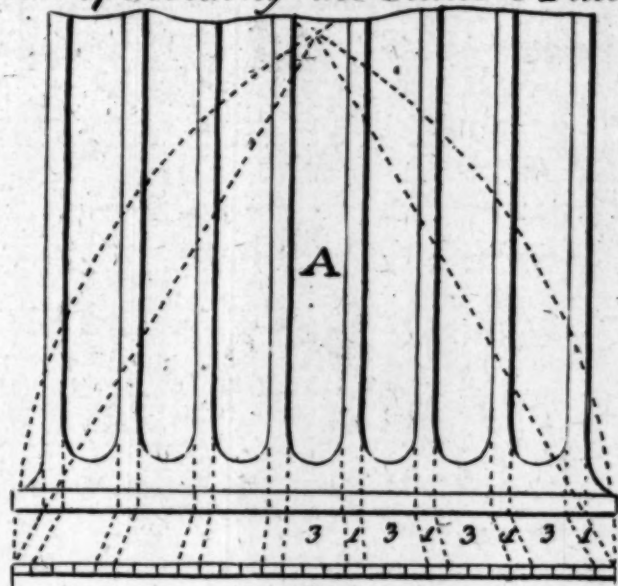
*The manner of transferring the Flutes & Fillets
on the Shaft of a Column* Plate 26



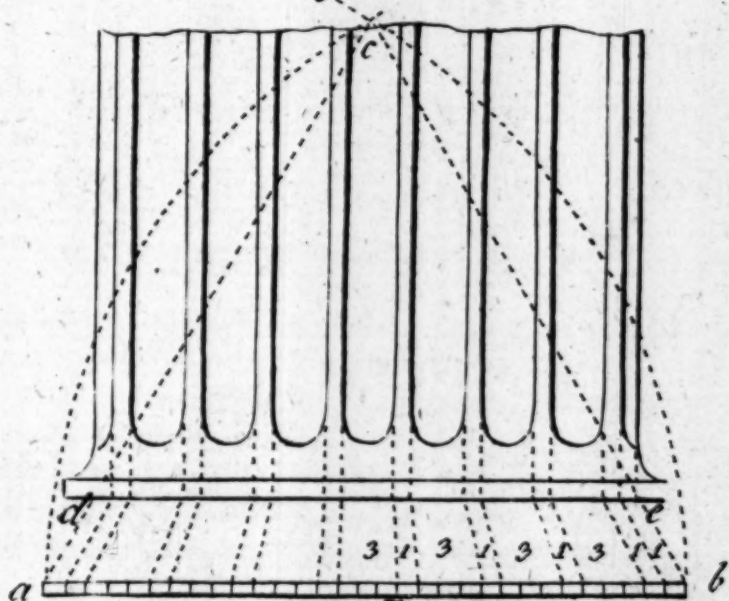
Divide a given length less than $\frac{1}{2}$ Circumference in 24 p.^{ts}
each part in 4 then 1 is a Fillet & 3 is a Flute —

The Manner of dividing the Flutes & Fillets of Pilaster

Plate 27



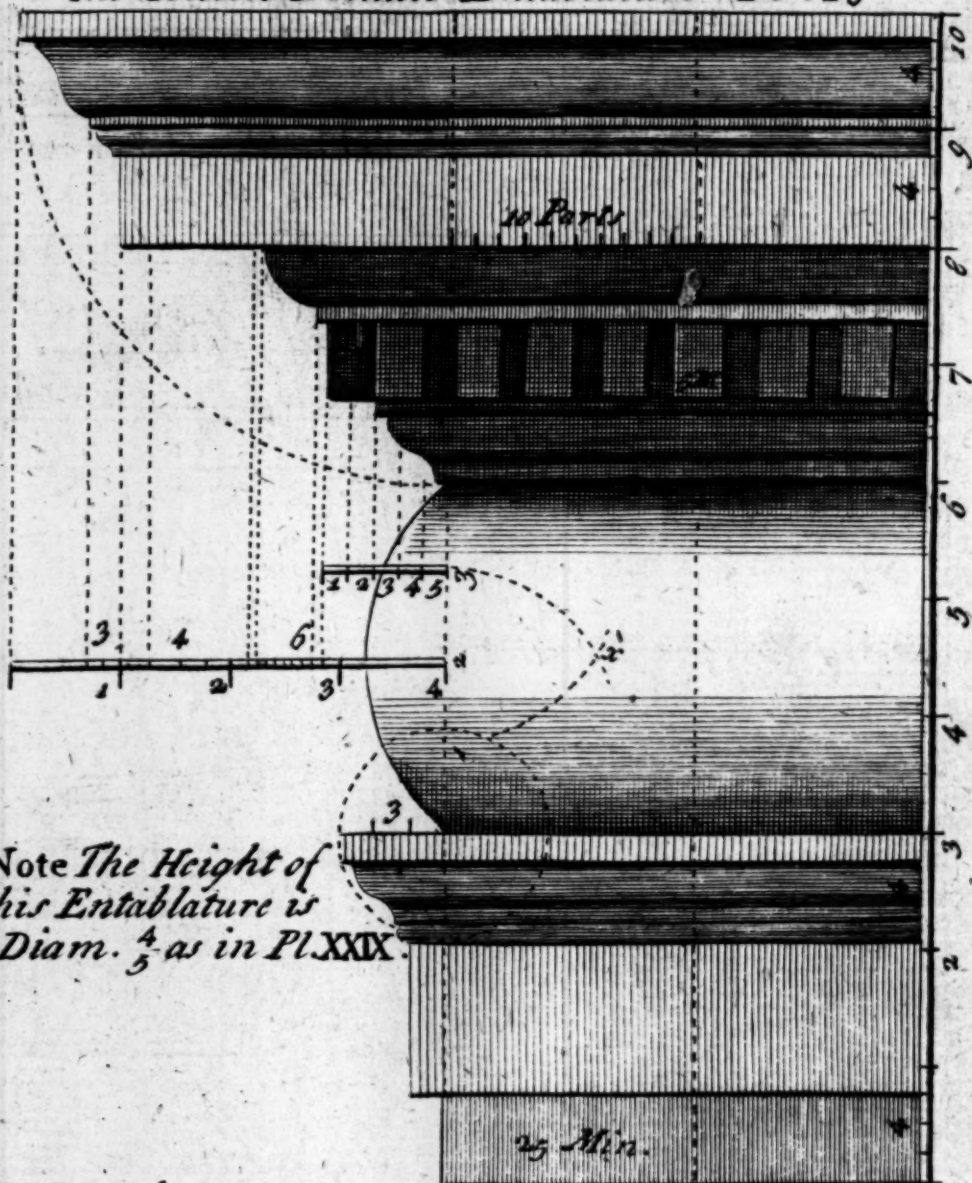
29 Parts



31 Parts

K

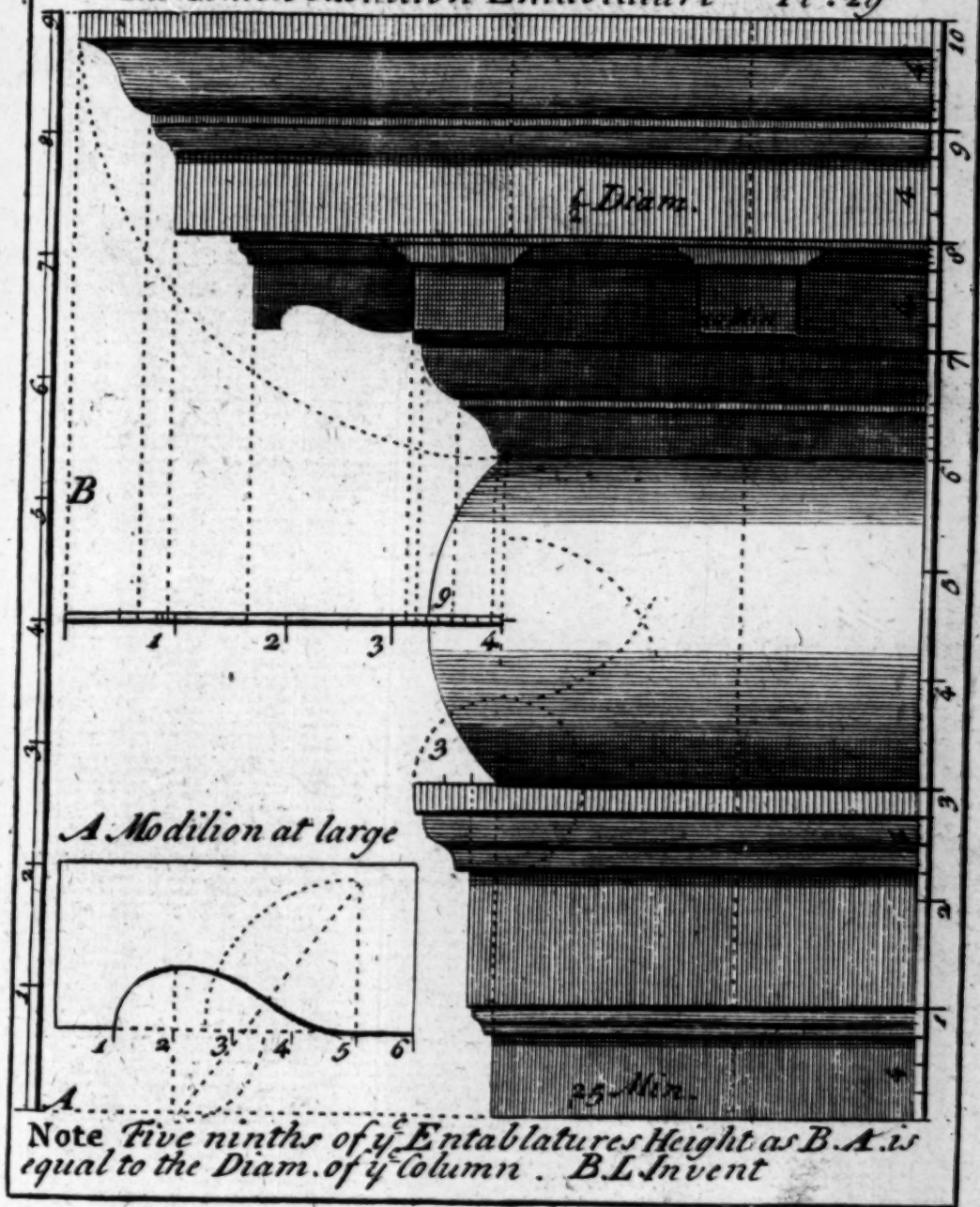
The Ionick Dentule Entablature Pl. 28



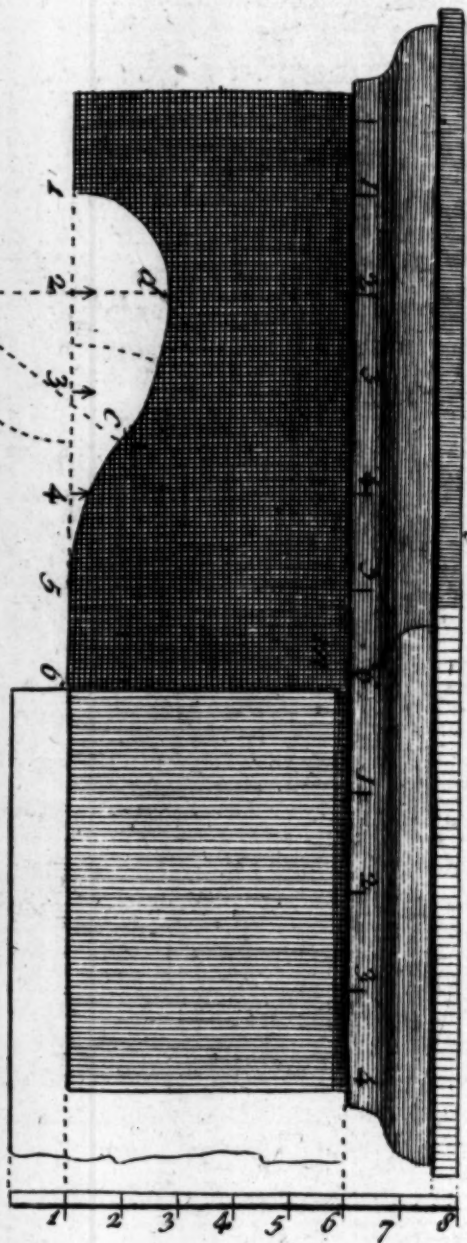
Note The Height of
this Entablature is
1 Diam. $\frac{4}{5}$ as in Pl. XXIX.

B Langley Invent

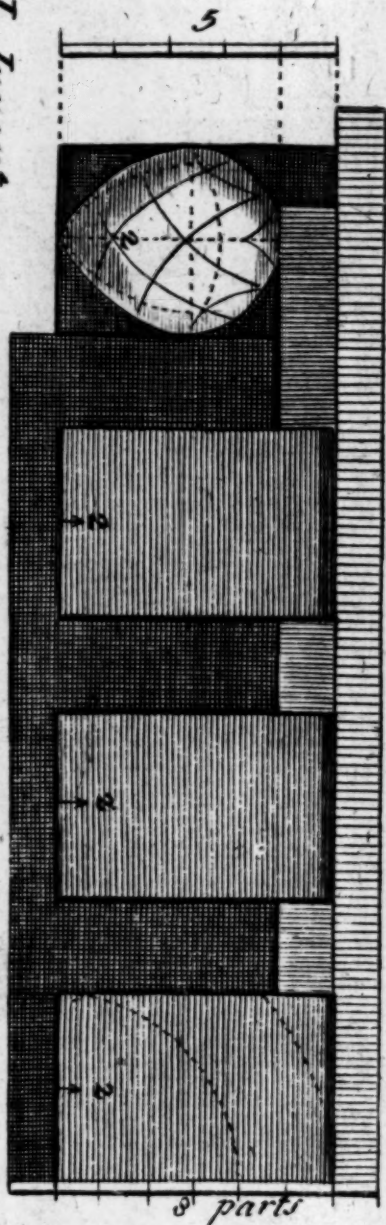
The Ionick Modilion Entablature Pl. 29

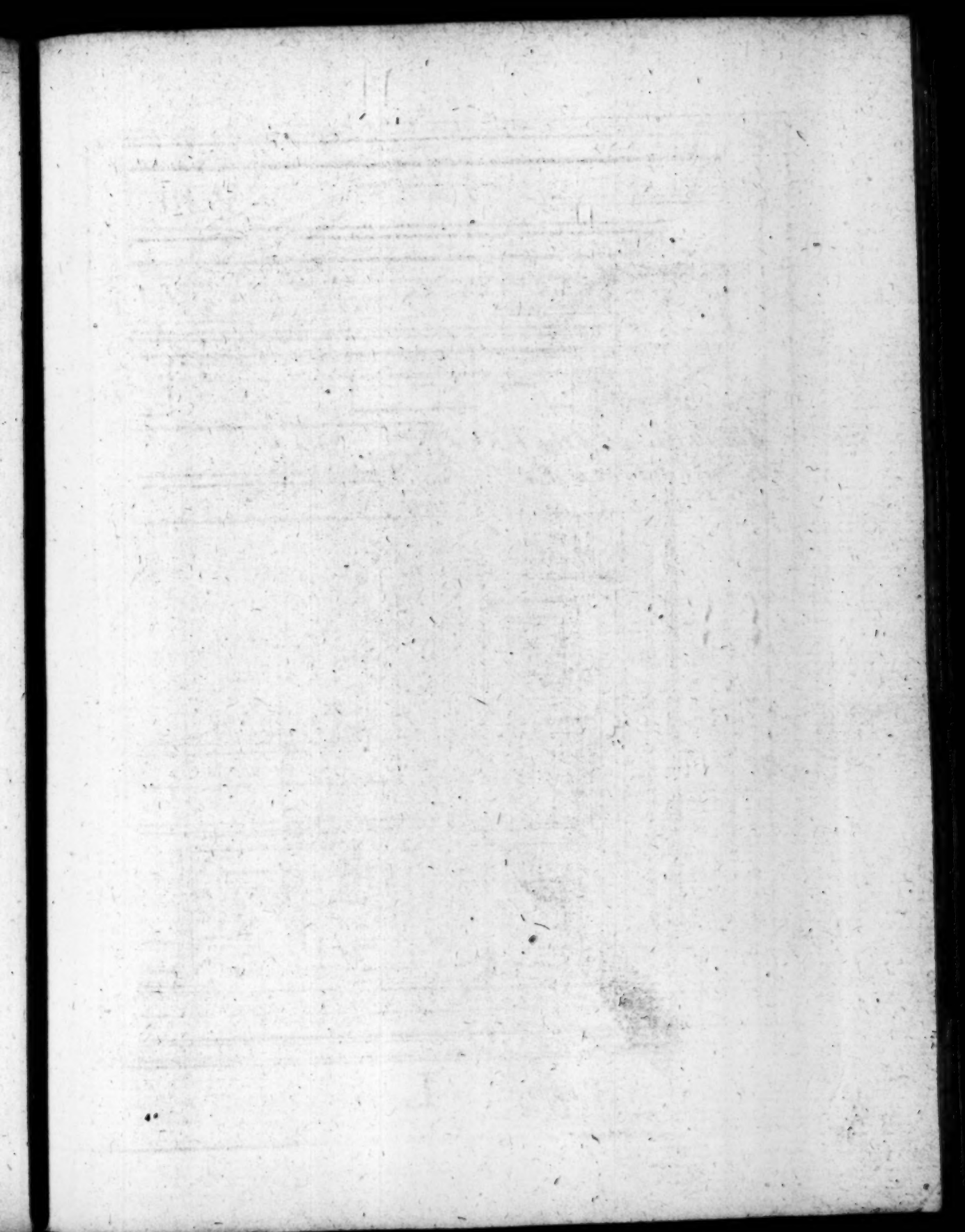


Tonick Motion at large

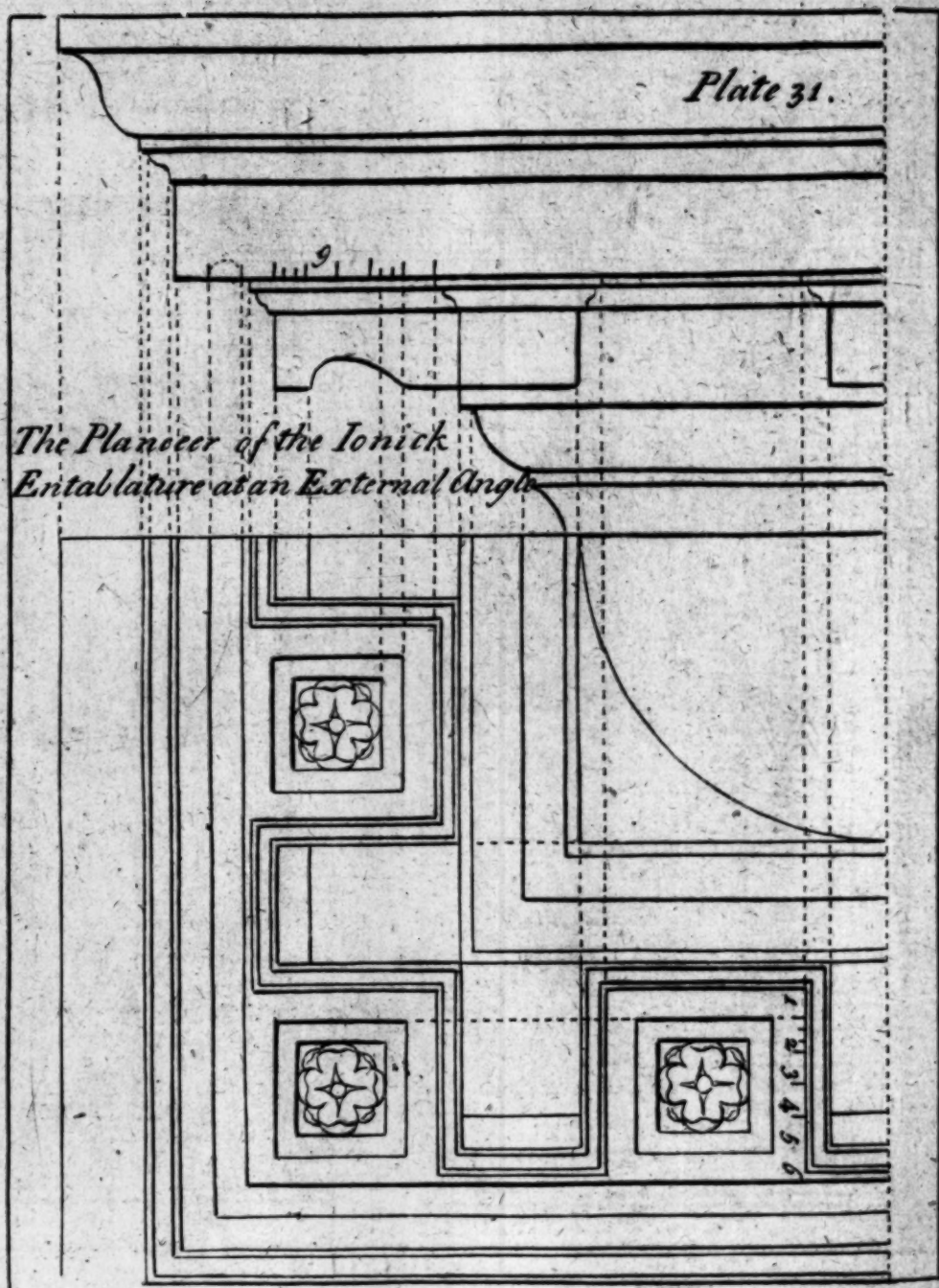


Tonick Dentures at large



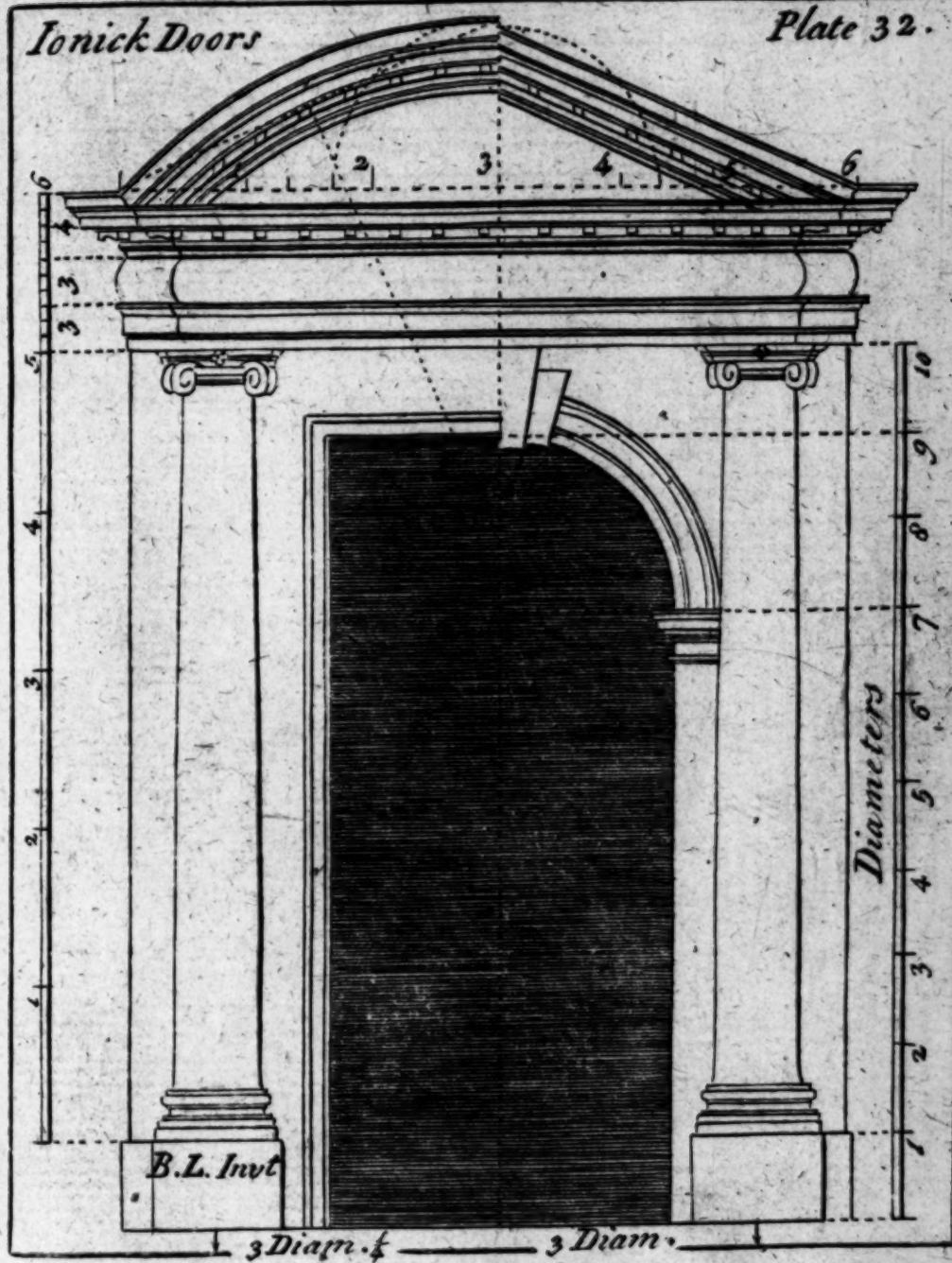


*The Planocor of the Ionick
Entablature at an External Angle*



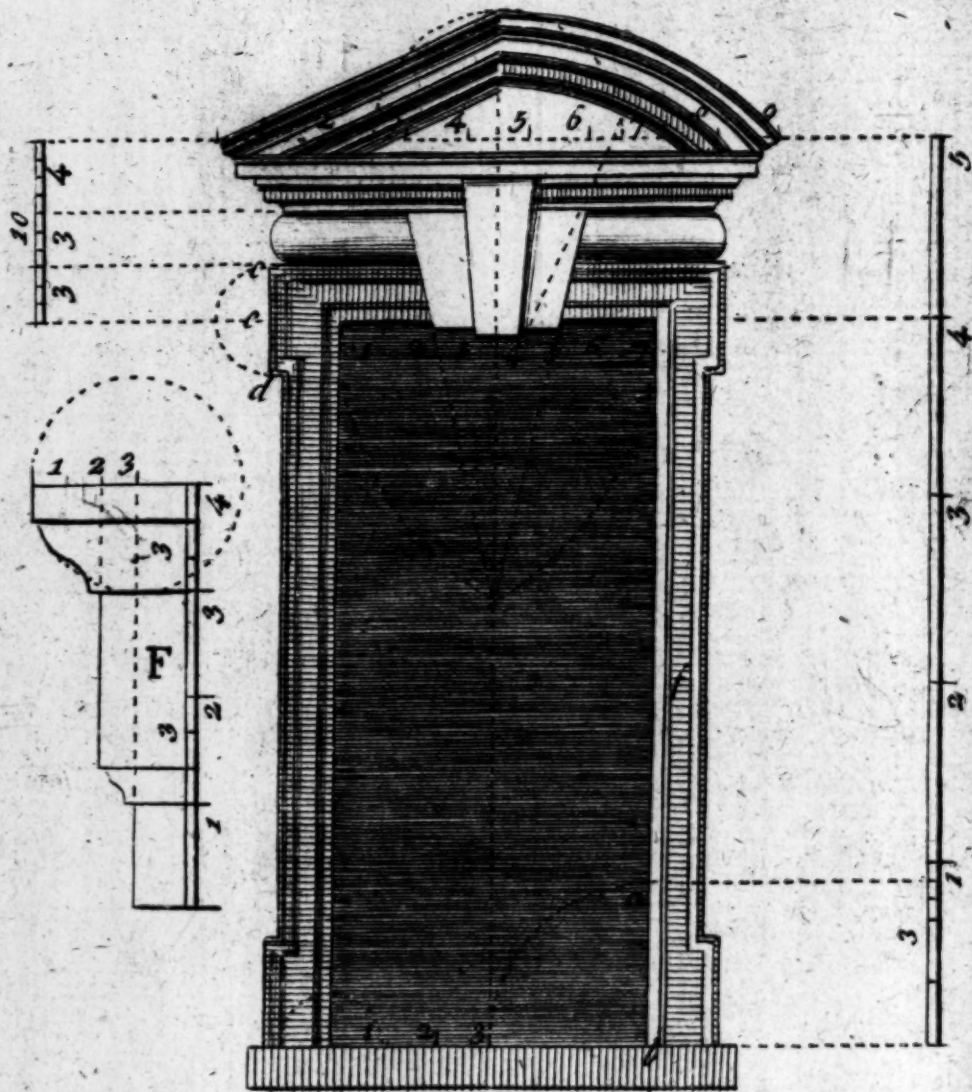
Ionick Doors

Plate 32.



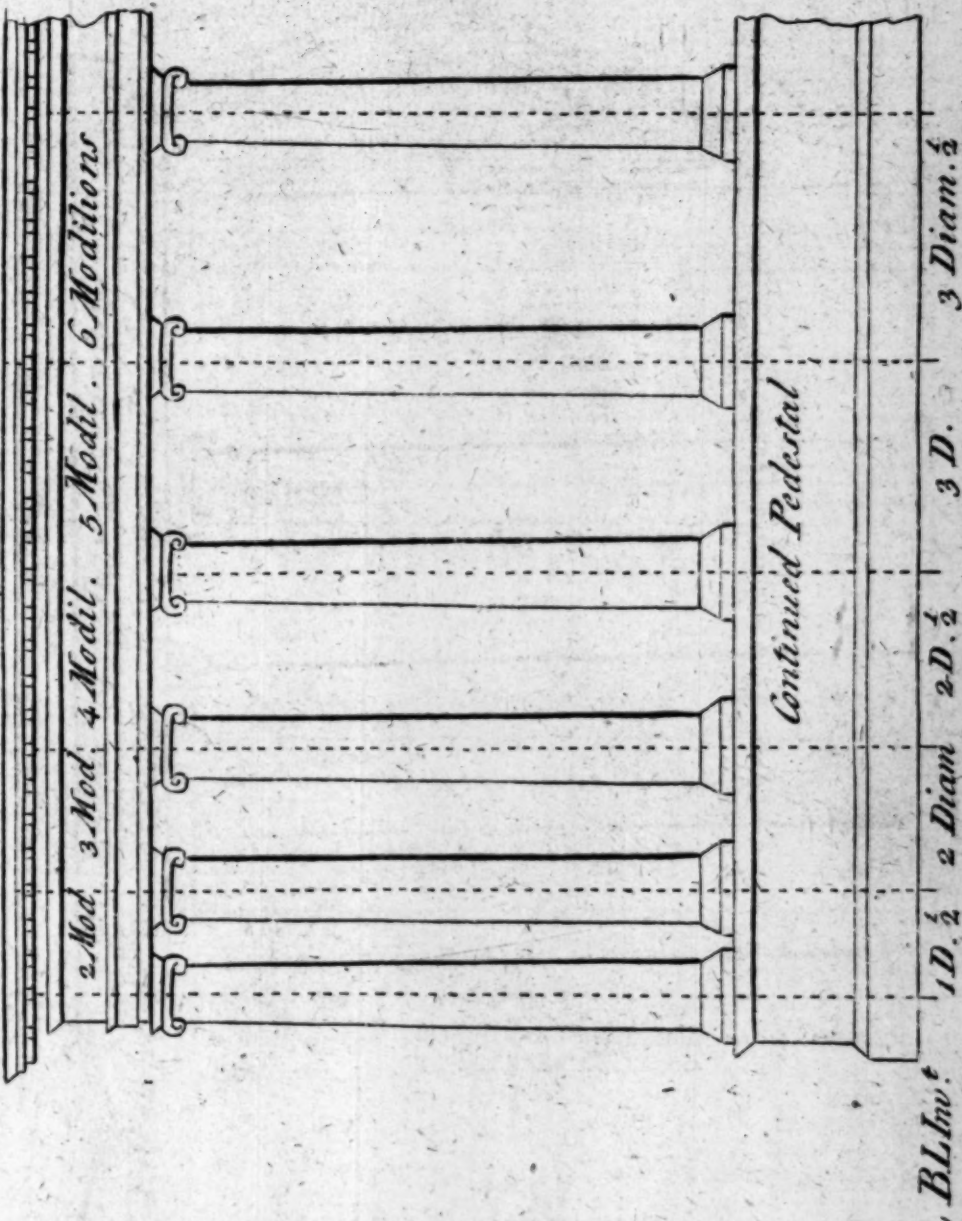
Ionick Window

Plate 33.



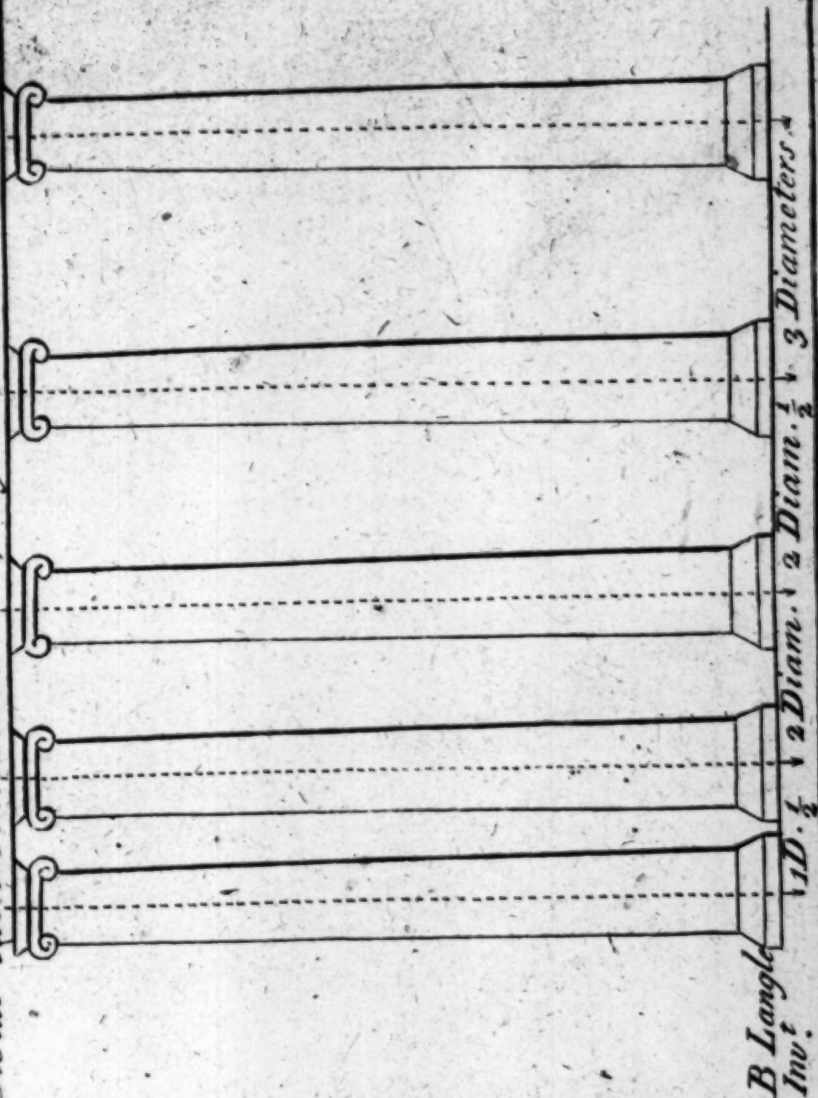
B. Langley Invent.

Ionick Intercolumniations for a Modilion Cornice.



Sonick Inter-columnations for a Dentule Cornice

12 Den 16 Dent 20 Dent 25 Dentules
Divide each Semidiameter in 12 give 2 a Dentule & 1 to an Interval



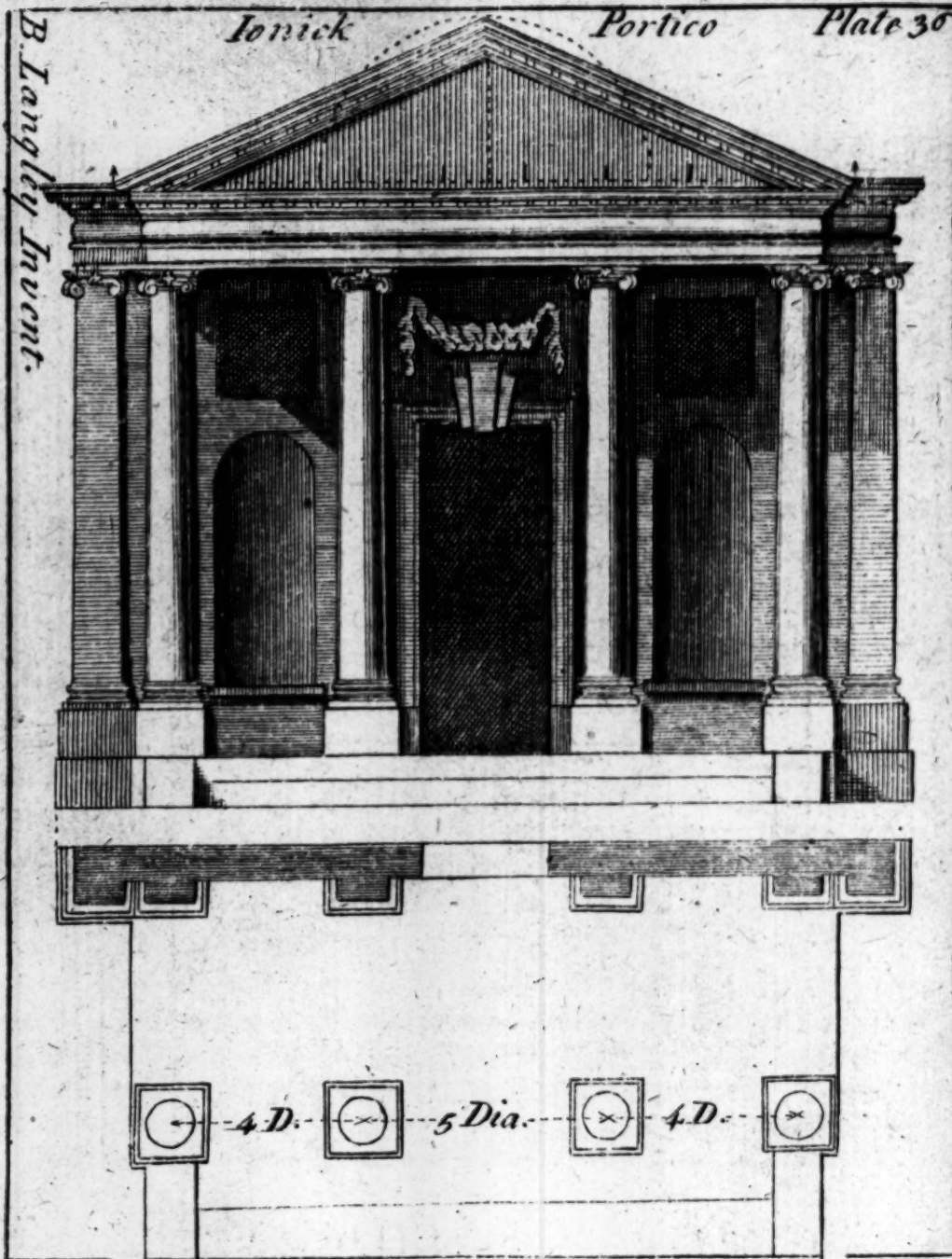
B Langle
Inv^t

B. Langley Incent.

Ionick

Portico

Plate 30

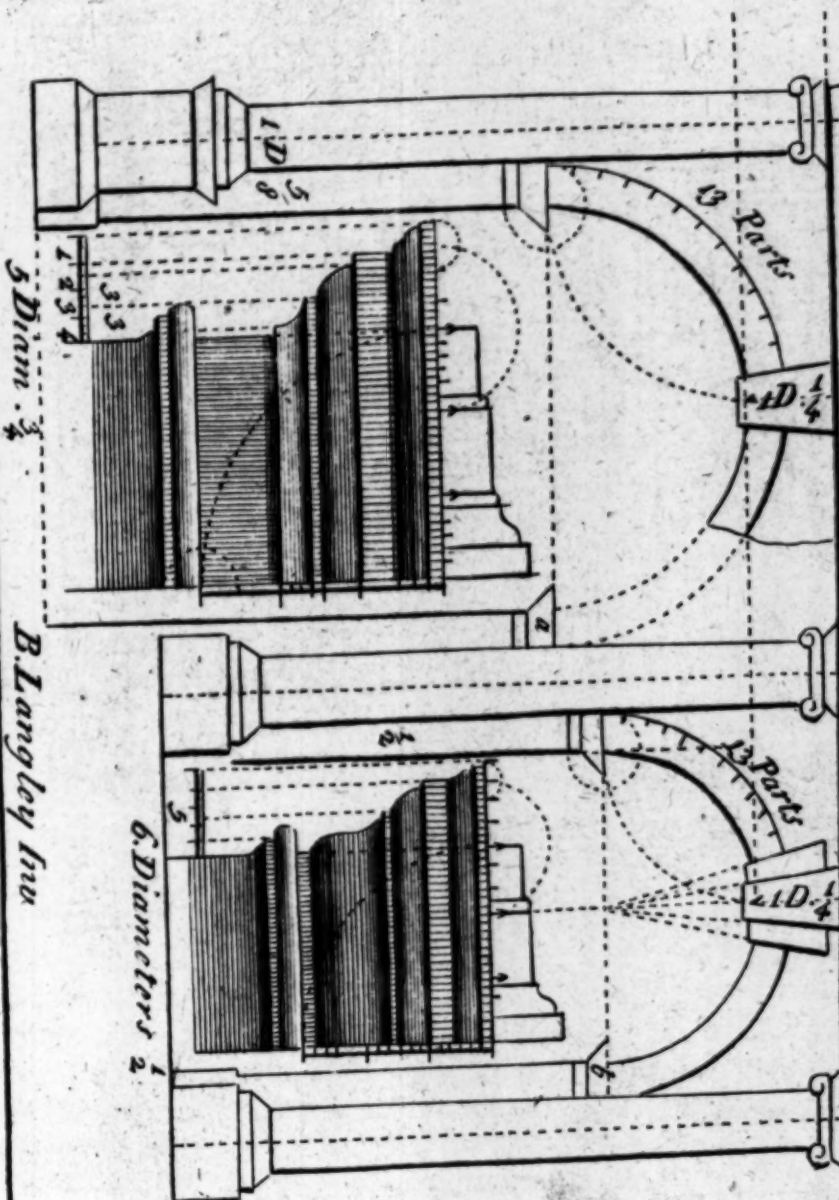


N

Ionick Arches & Imposts

16 Modillions.

13 Modillions.



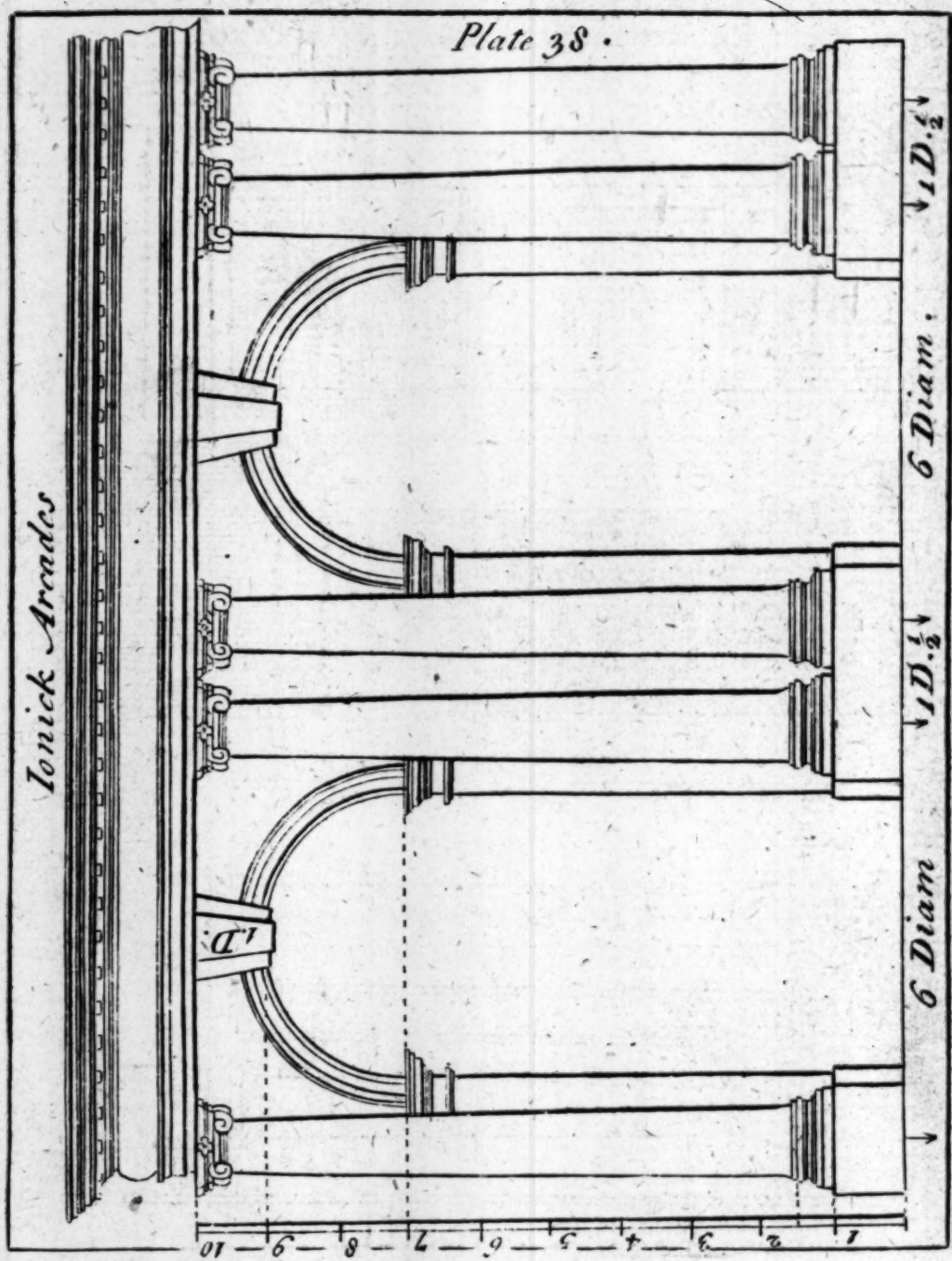
3 Diam. $\frac{3}{4}$

B. Langley Inv

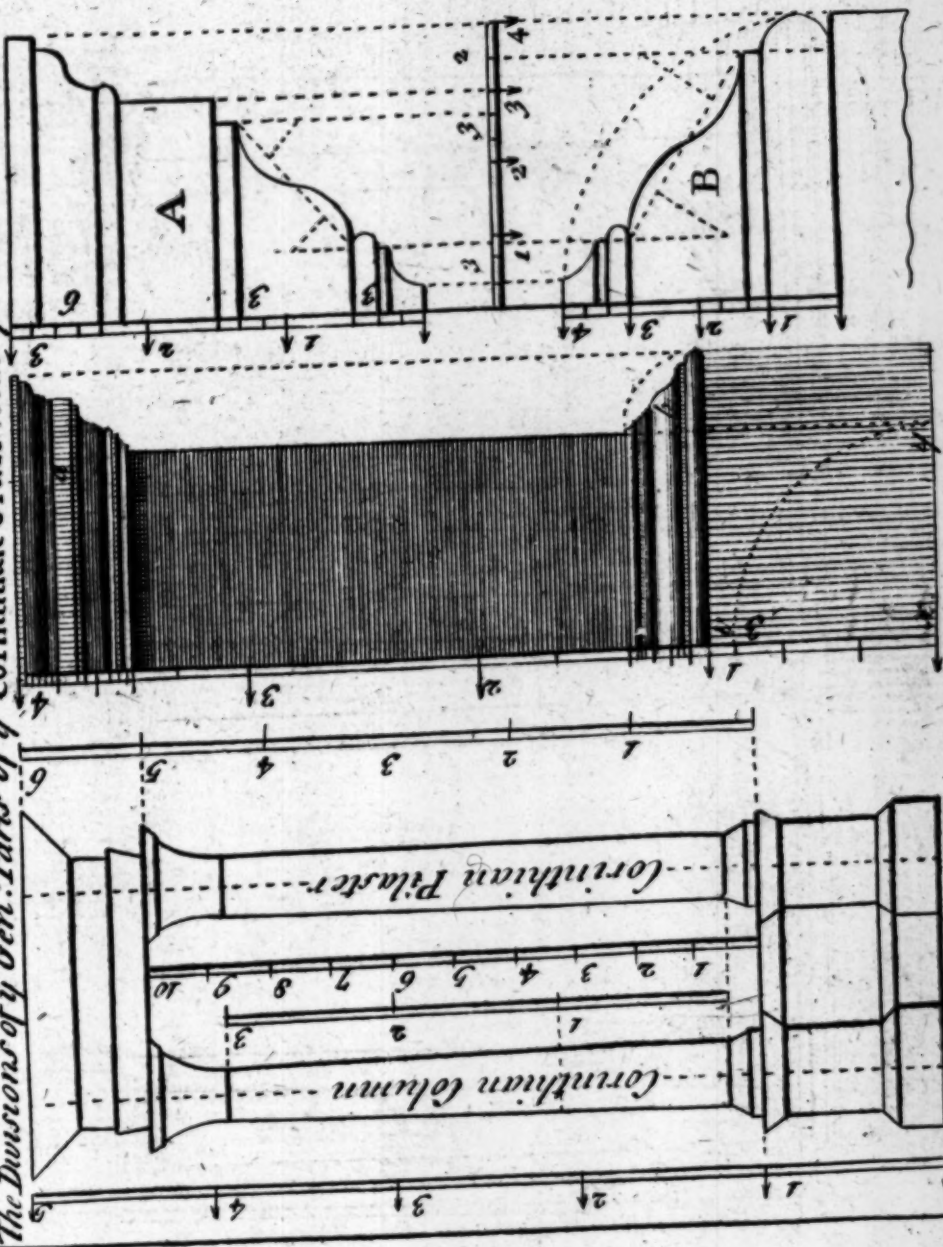
6. Diameter $\frac{1}{2}$

Pl. 37.

Ionick Arcades



The Divisions of y Gen. Parts of y Corinthian Order with y Pedestal & its P^{te} at large



Batty Langley Invent.

The various Kinds of Leaves for the Enrichment of Capitals

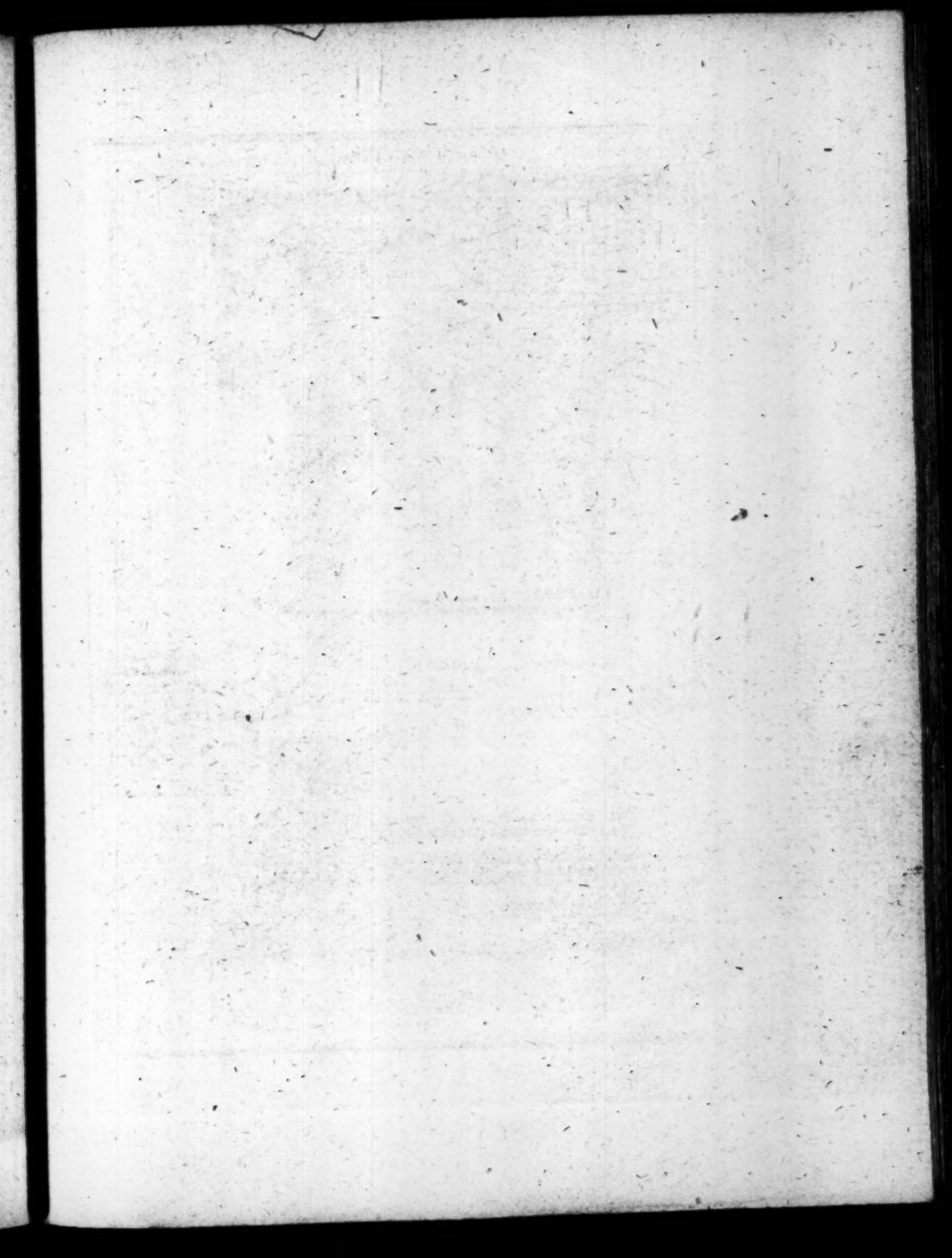
Plate 40.



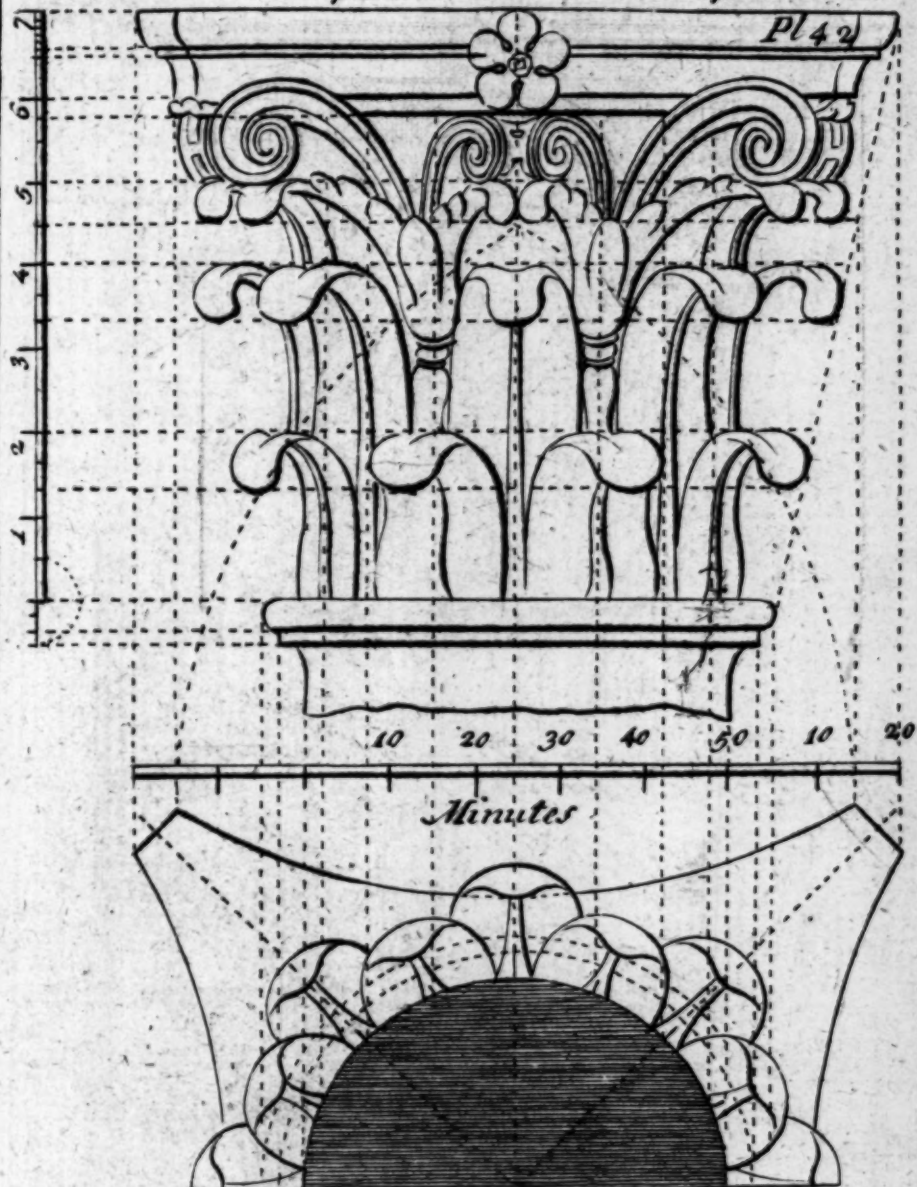
olive



Laurel



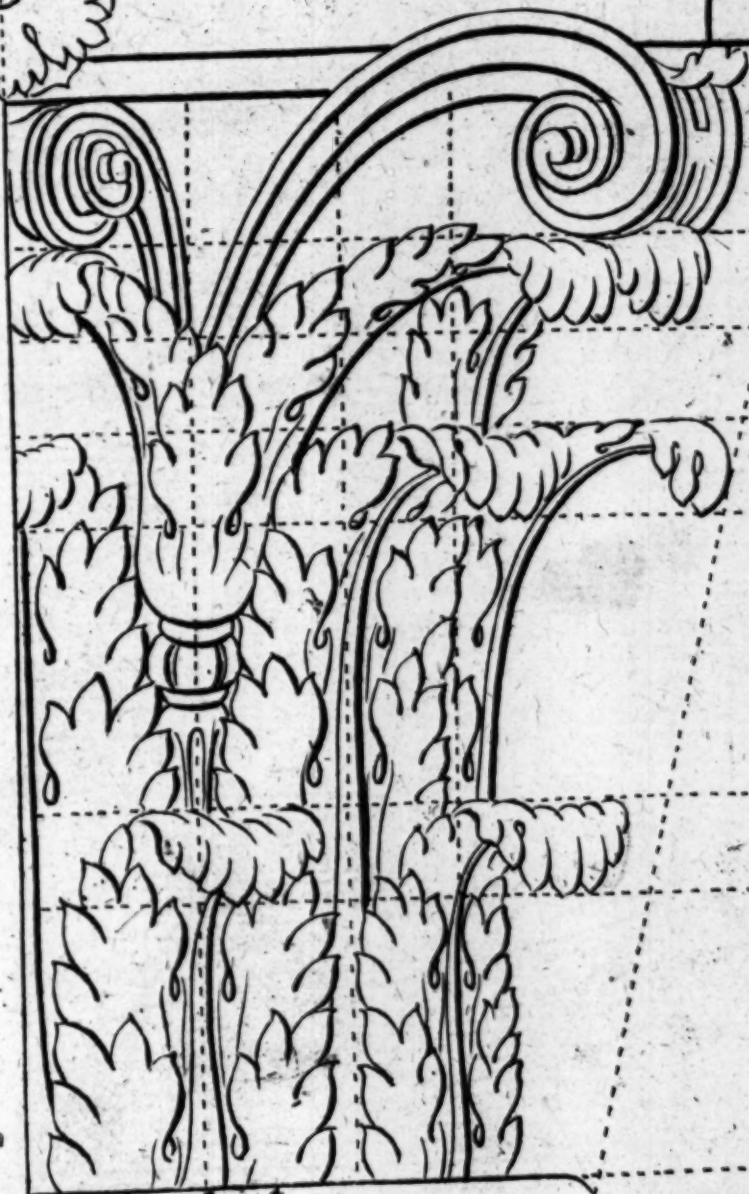
The Corinthian Capital with its Plan for a Column



Batty Langley Invent

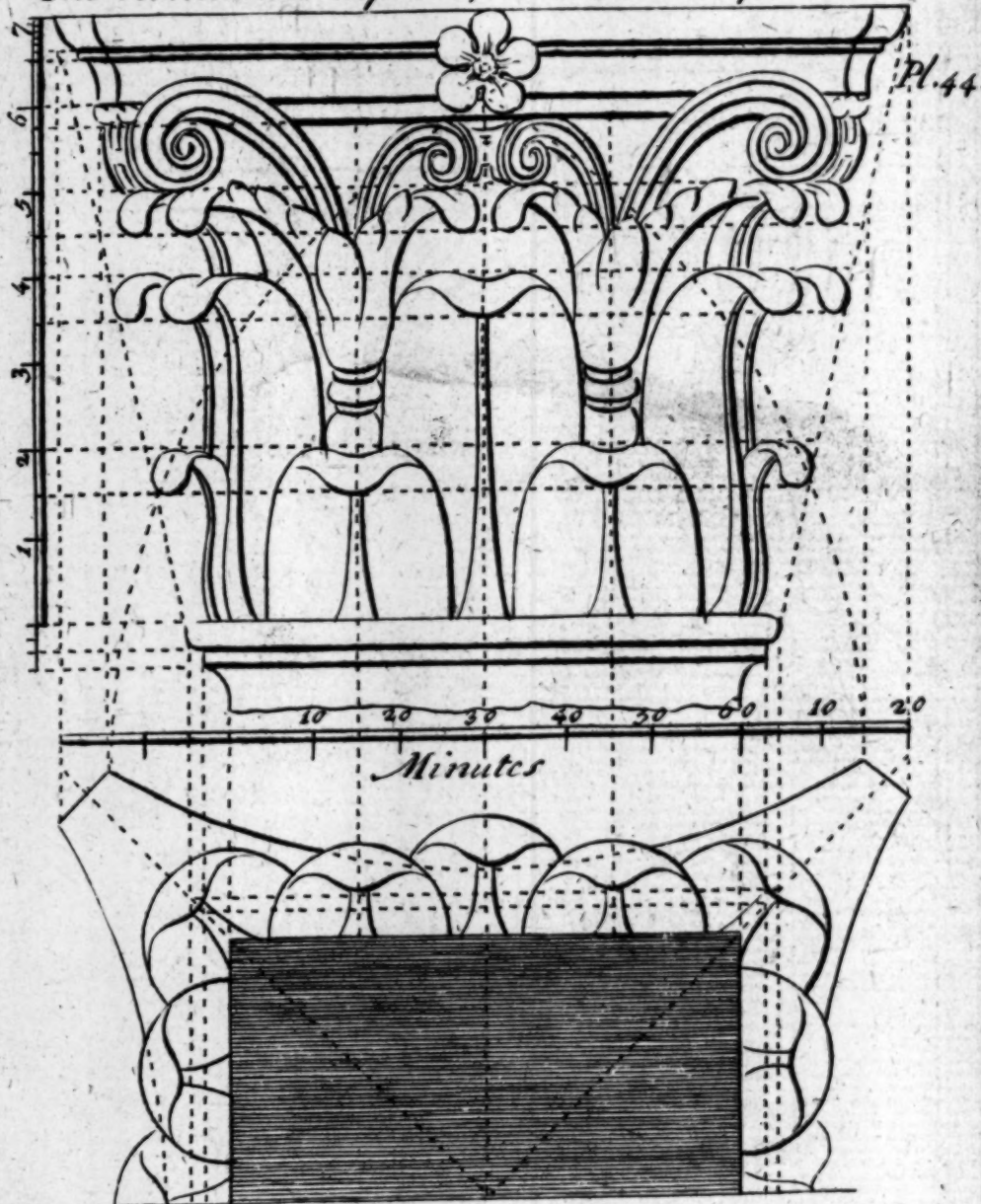
Corinthian Capital for a Column at large.

Pl. 43.



B. Langley Inv^t

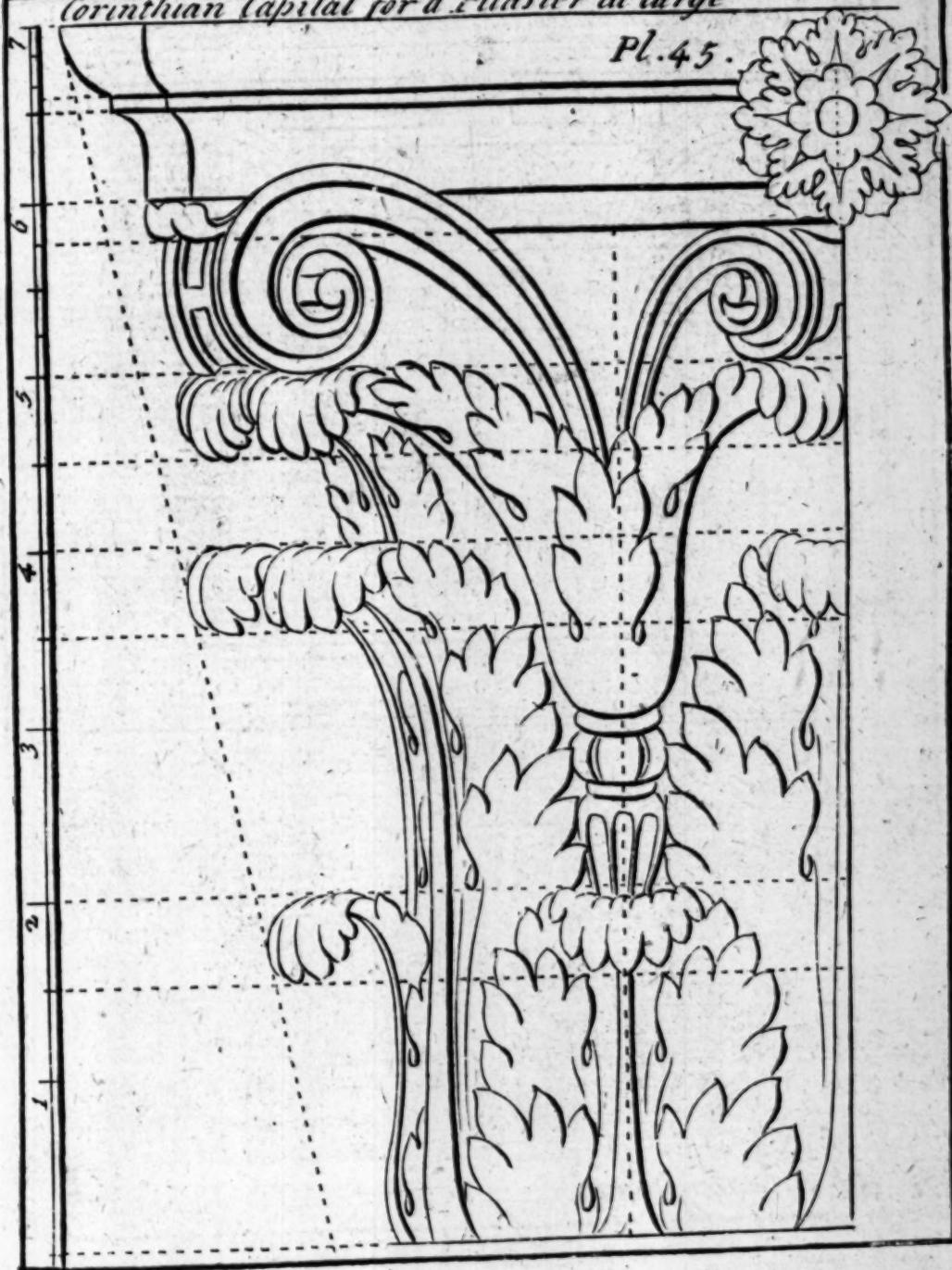
The Corinthian Capital, with its Plan for a Pilaster



Batty Langley Invt.

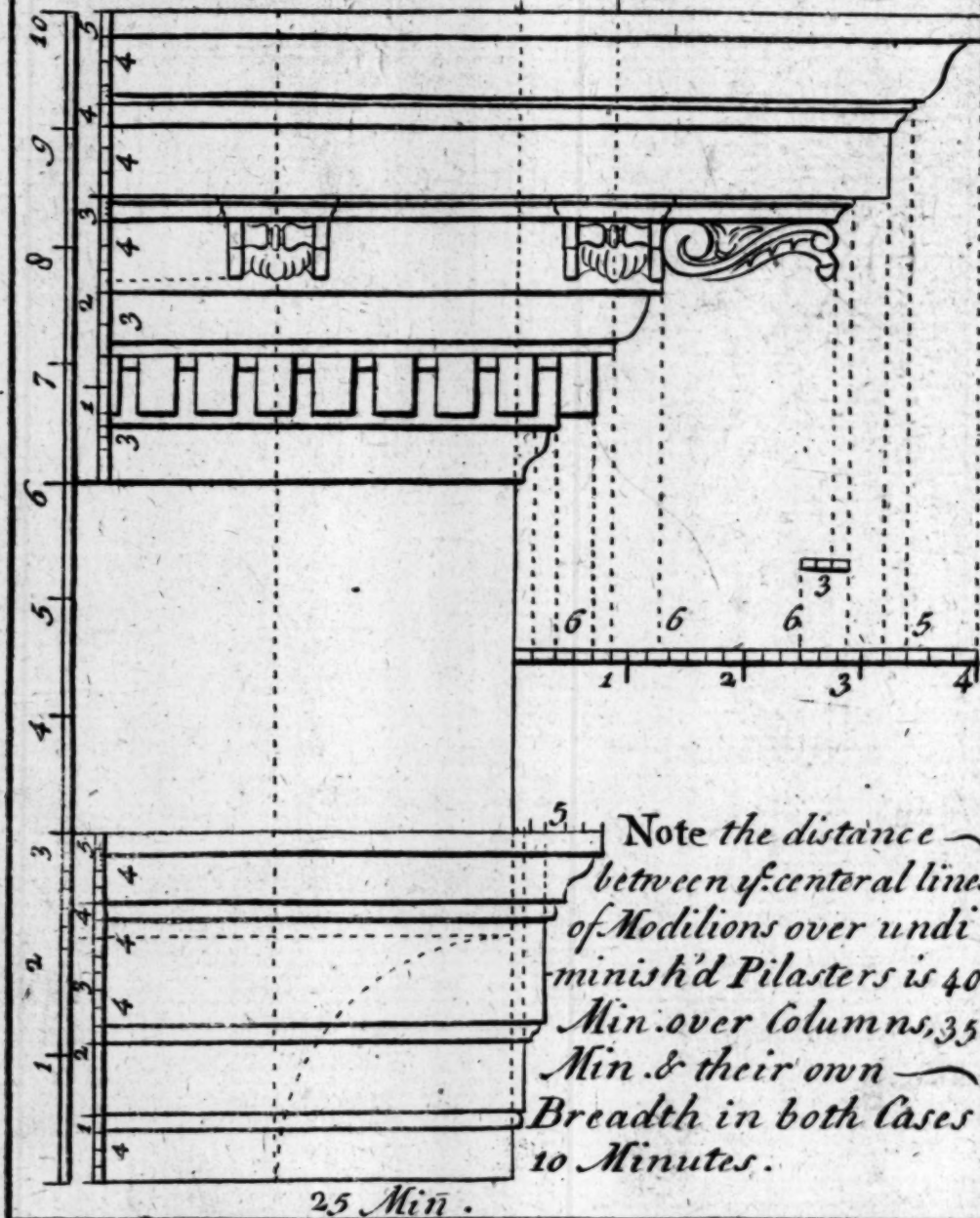
Corinthian Capital for a Pilaster at large

Pl. 45.

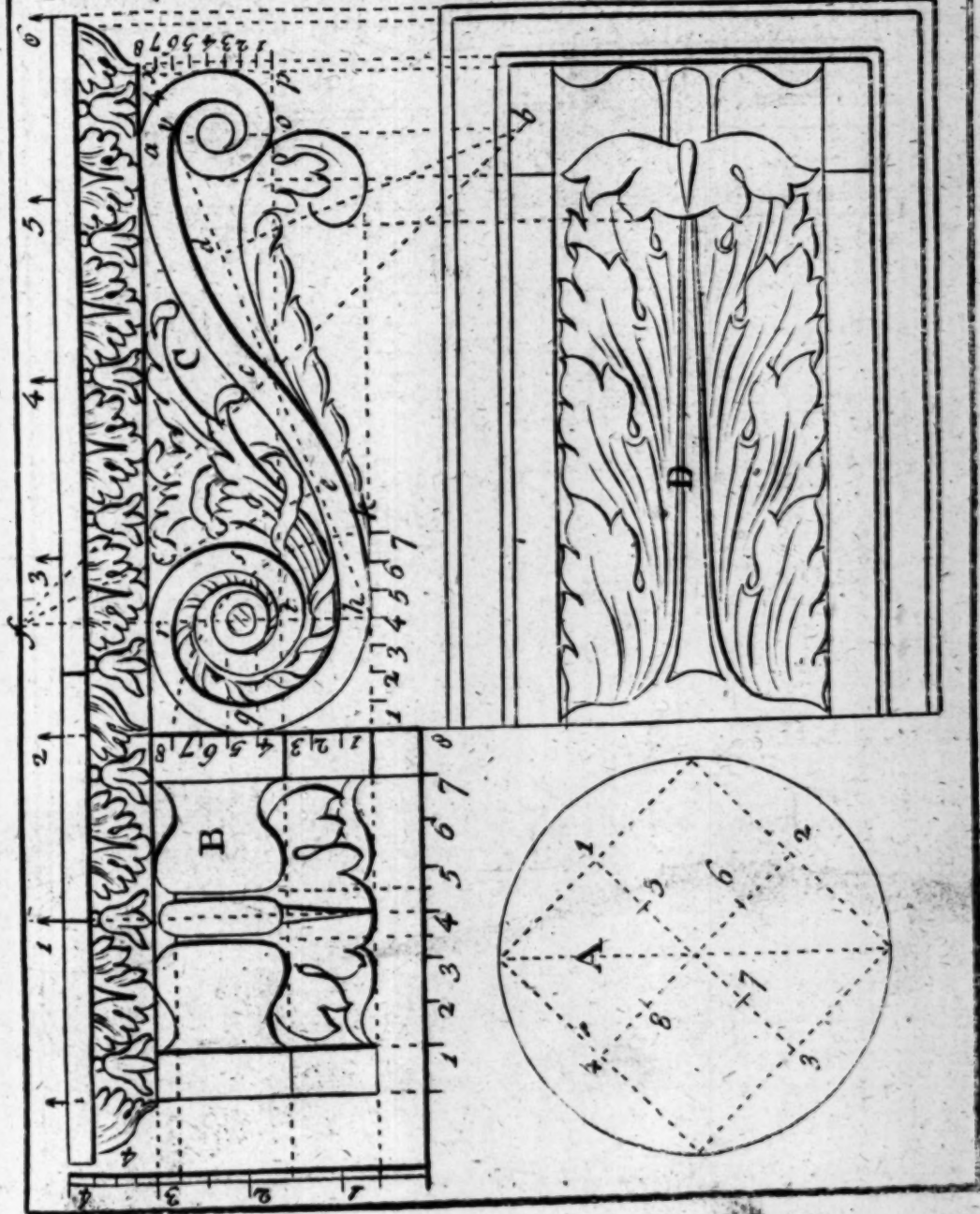


Corinthian Entablature

Plate 46

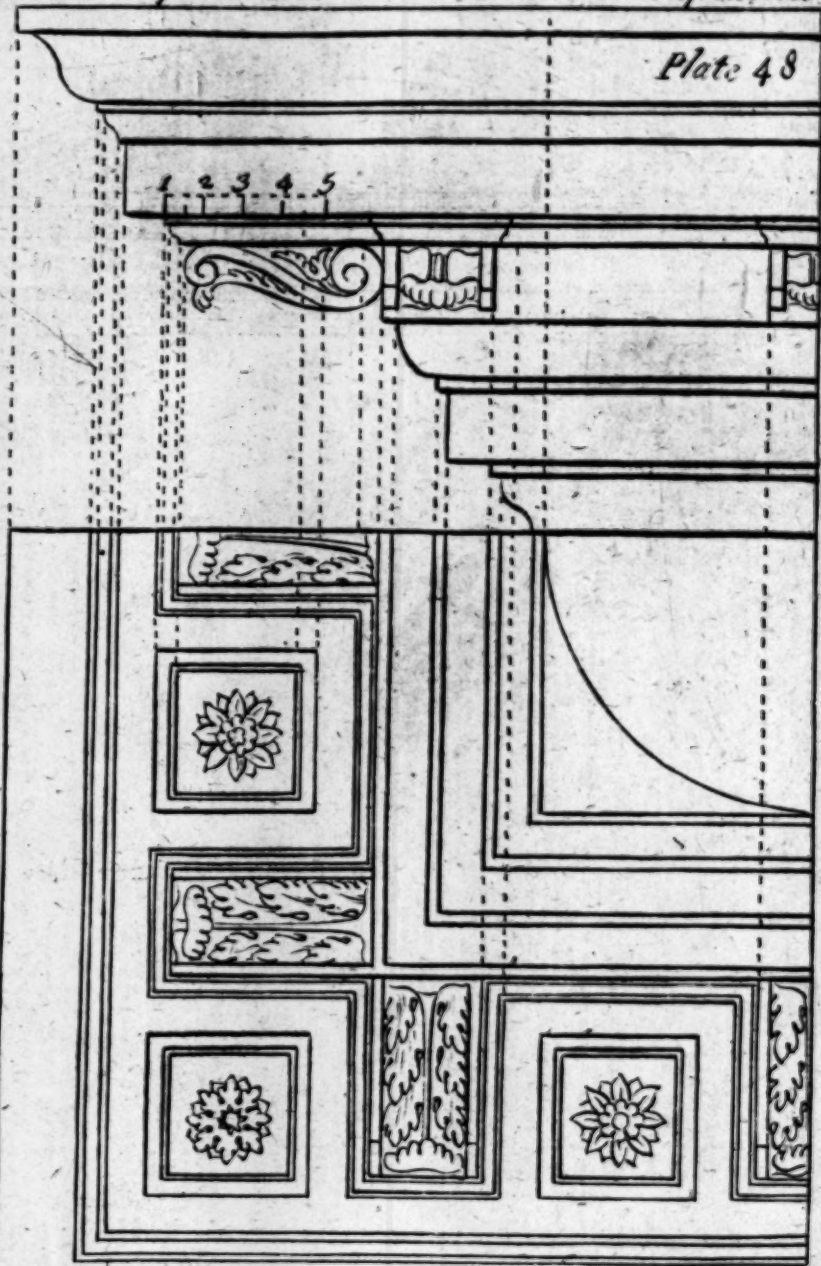


The Corinthian Modillion explain'd Plate 47.

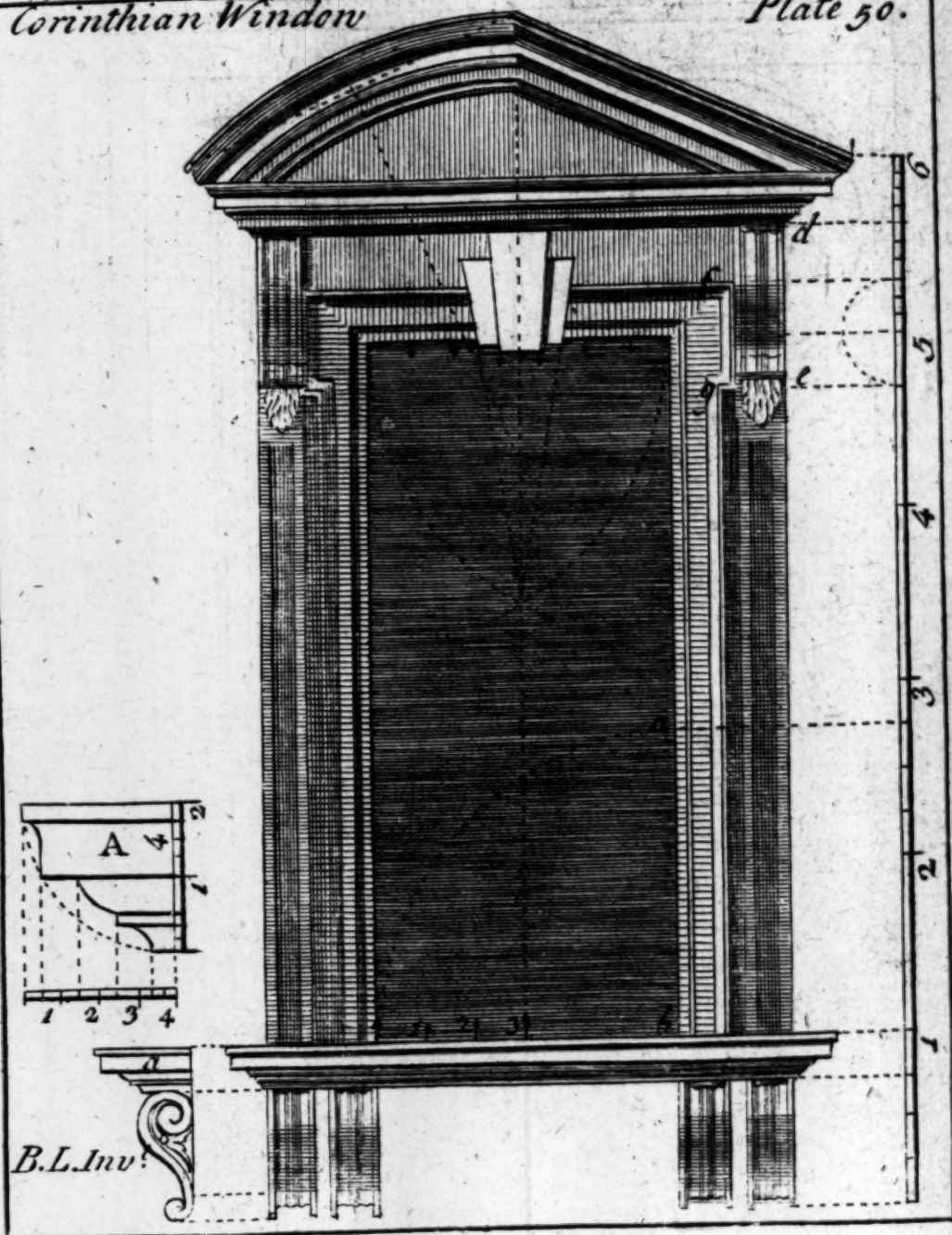


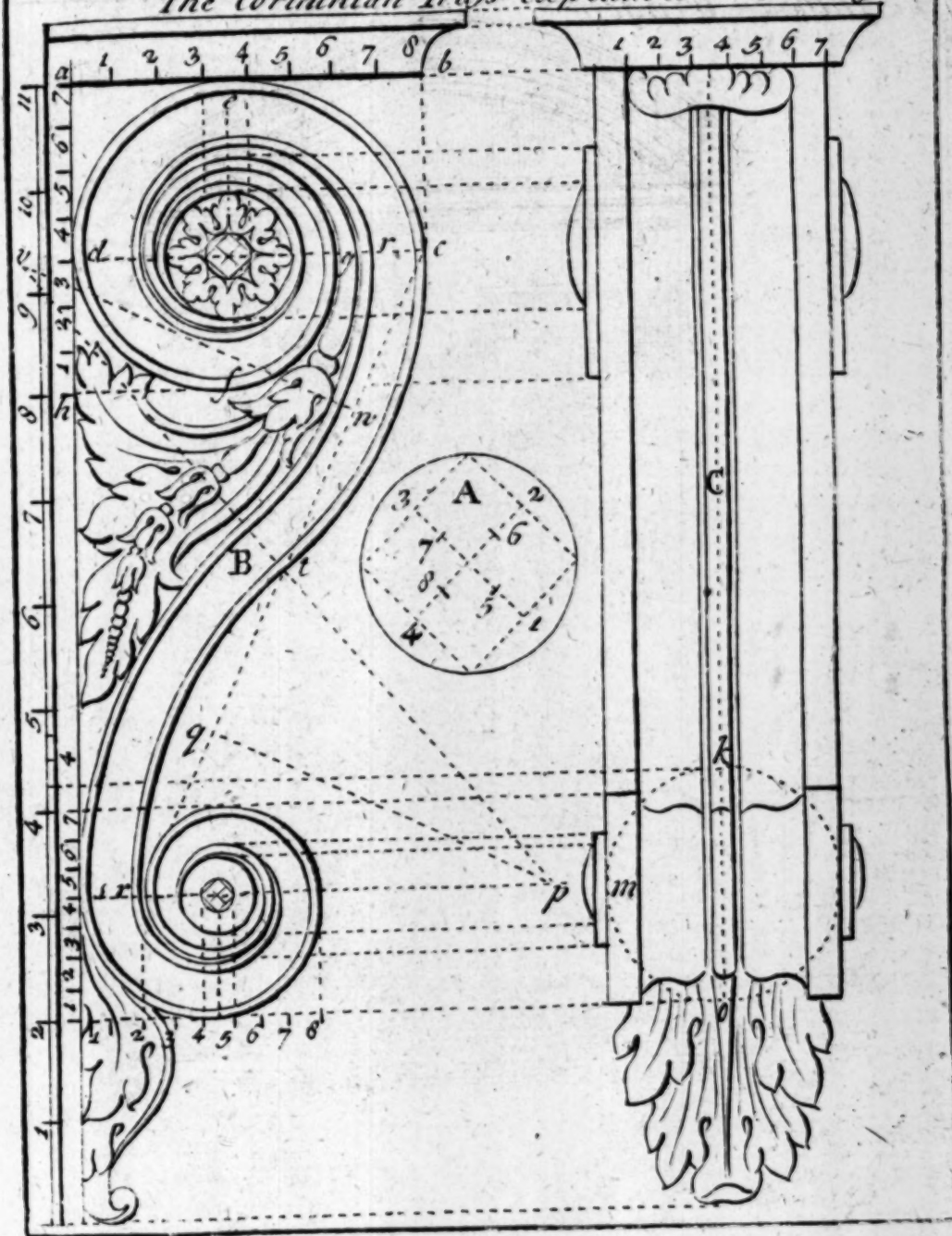
The Return of the Corinthian Planceer explaind

Plate 48

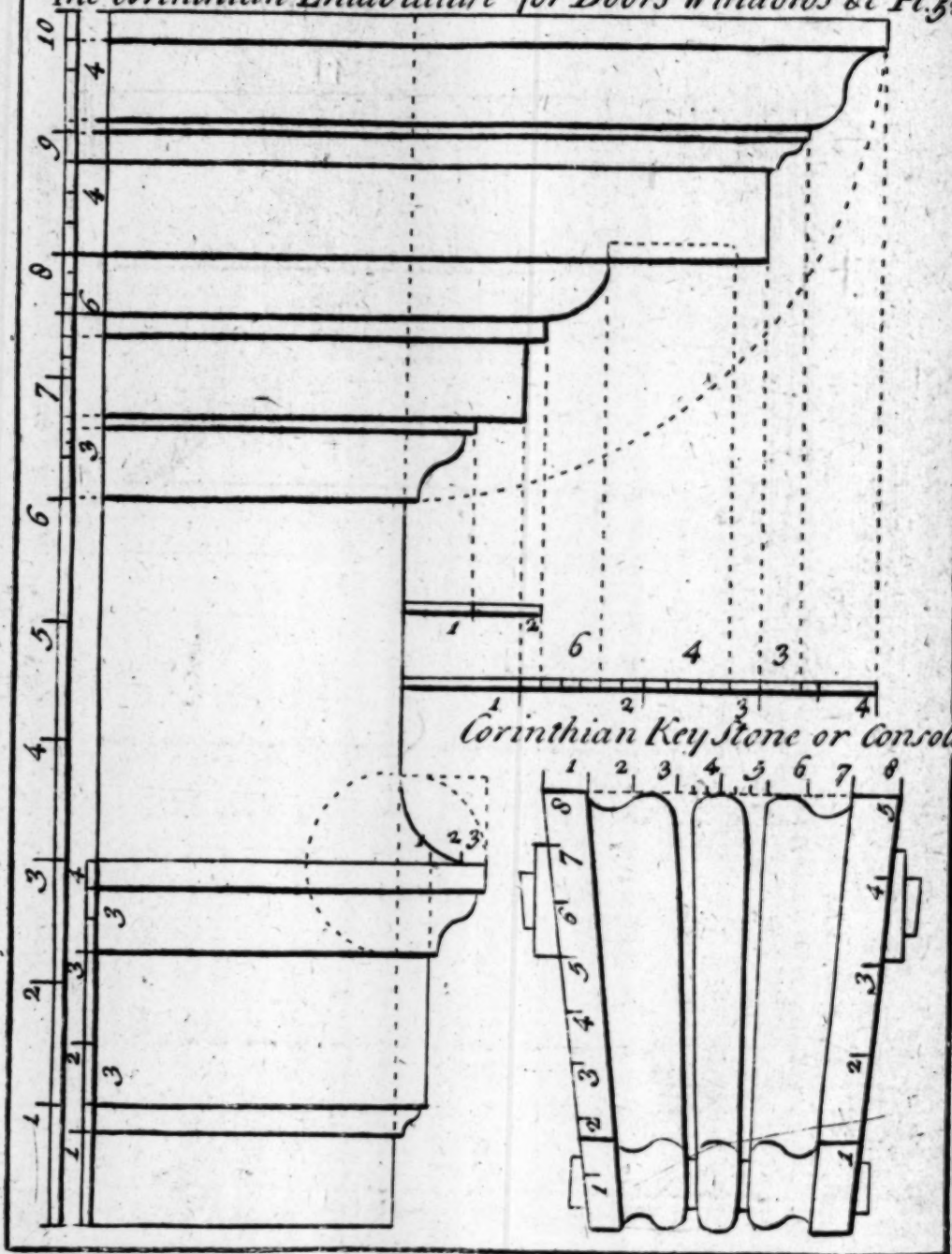




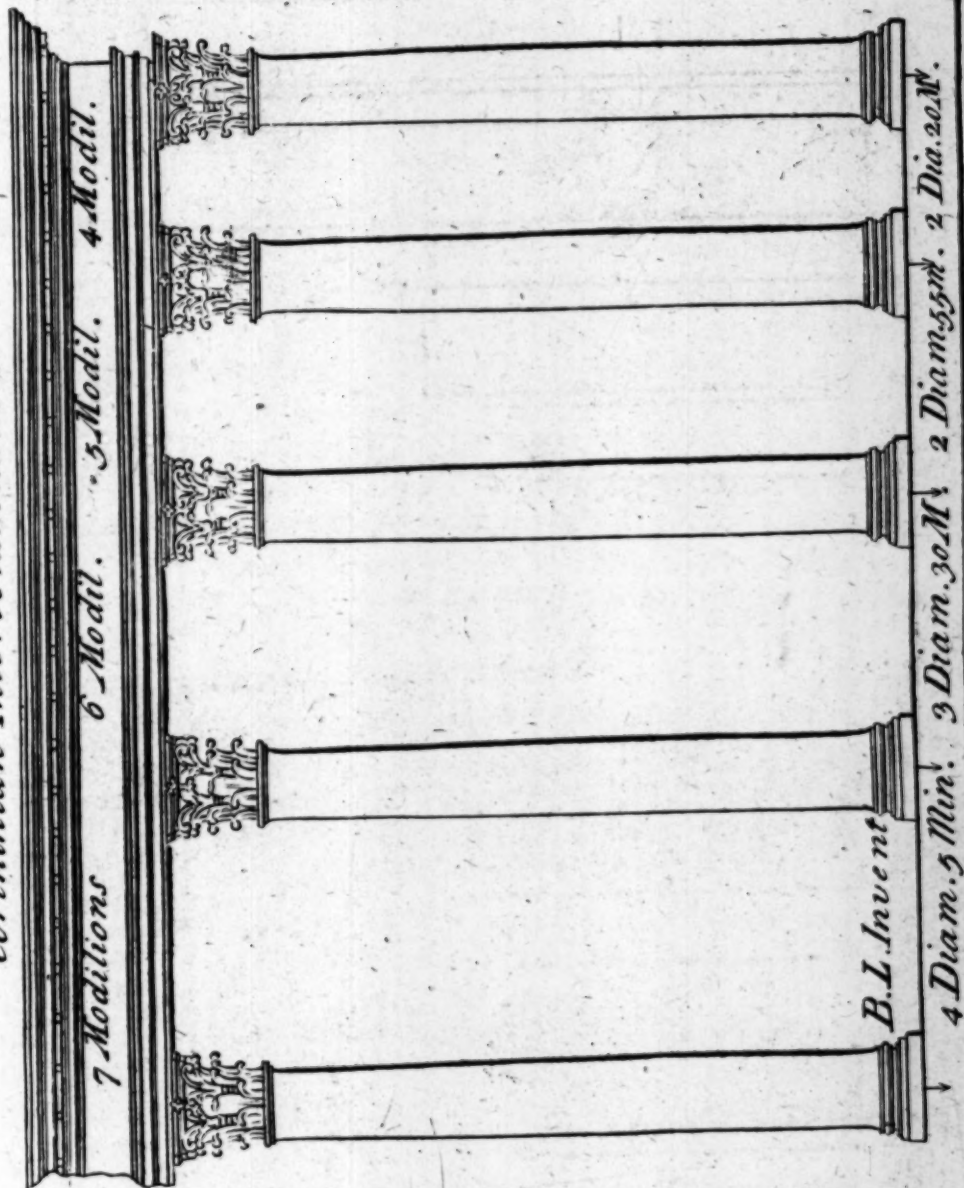




The Corinthian Entablature for Doors Windows &c Pl. 52



Corinthian Intercolumnations



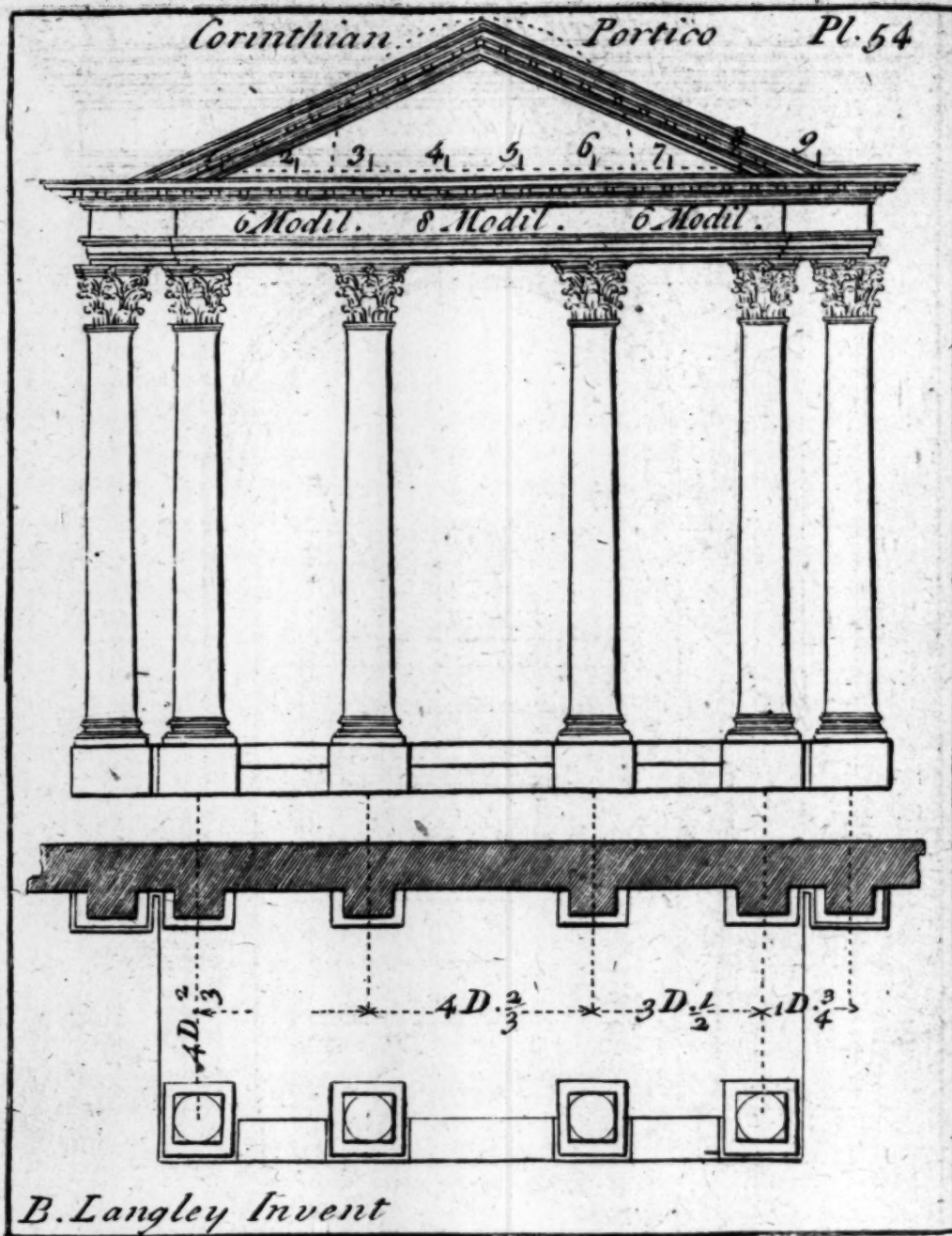
B.L. Invent

4 Diam. 5 Min. 3 Diam. 30 M. 2 Diam. 35 M. 2 Diam. 20 M.

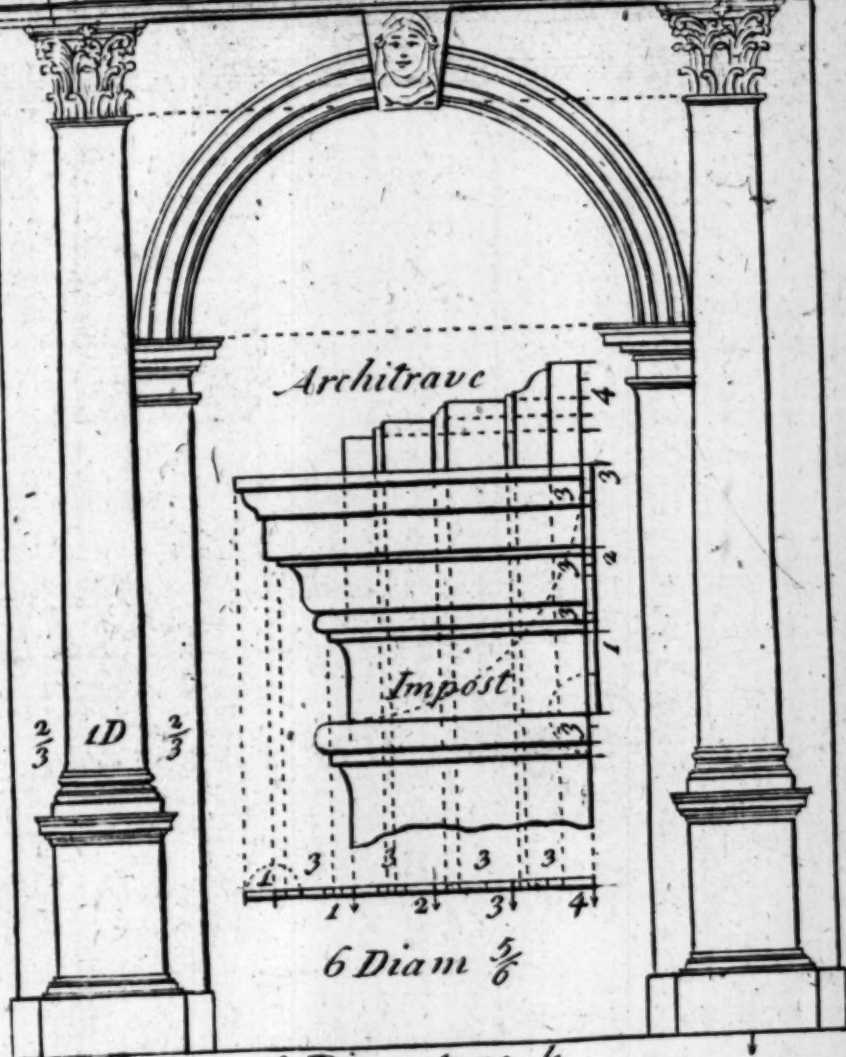
Corinthian

Portico

Pl. 54



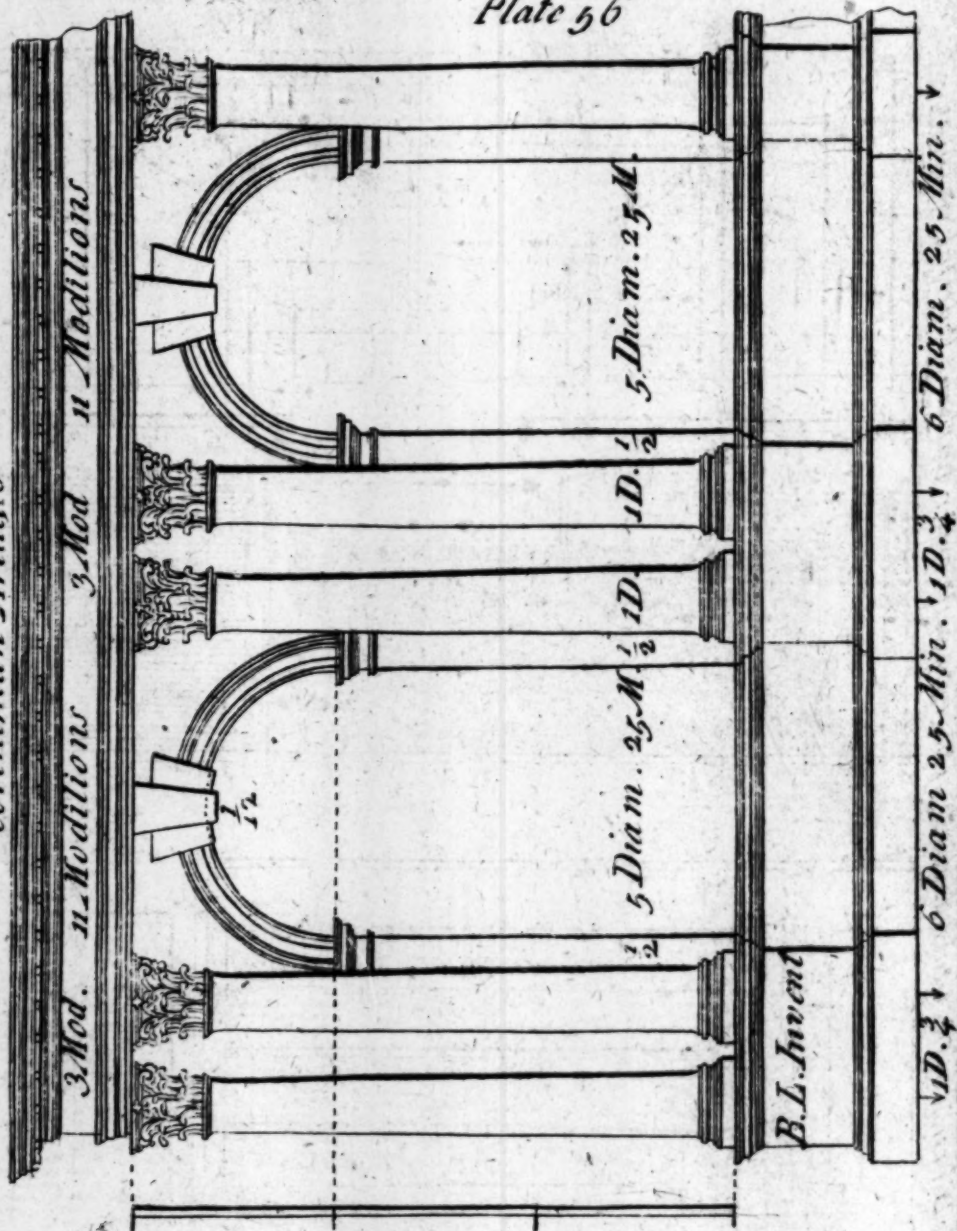
14 Modillions



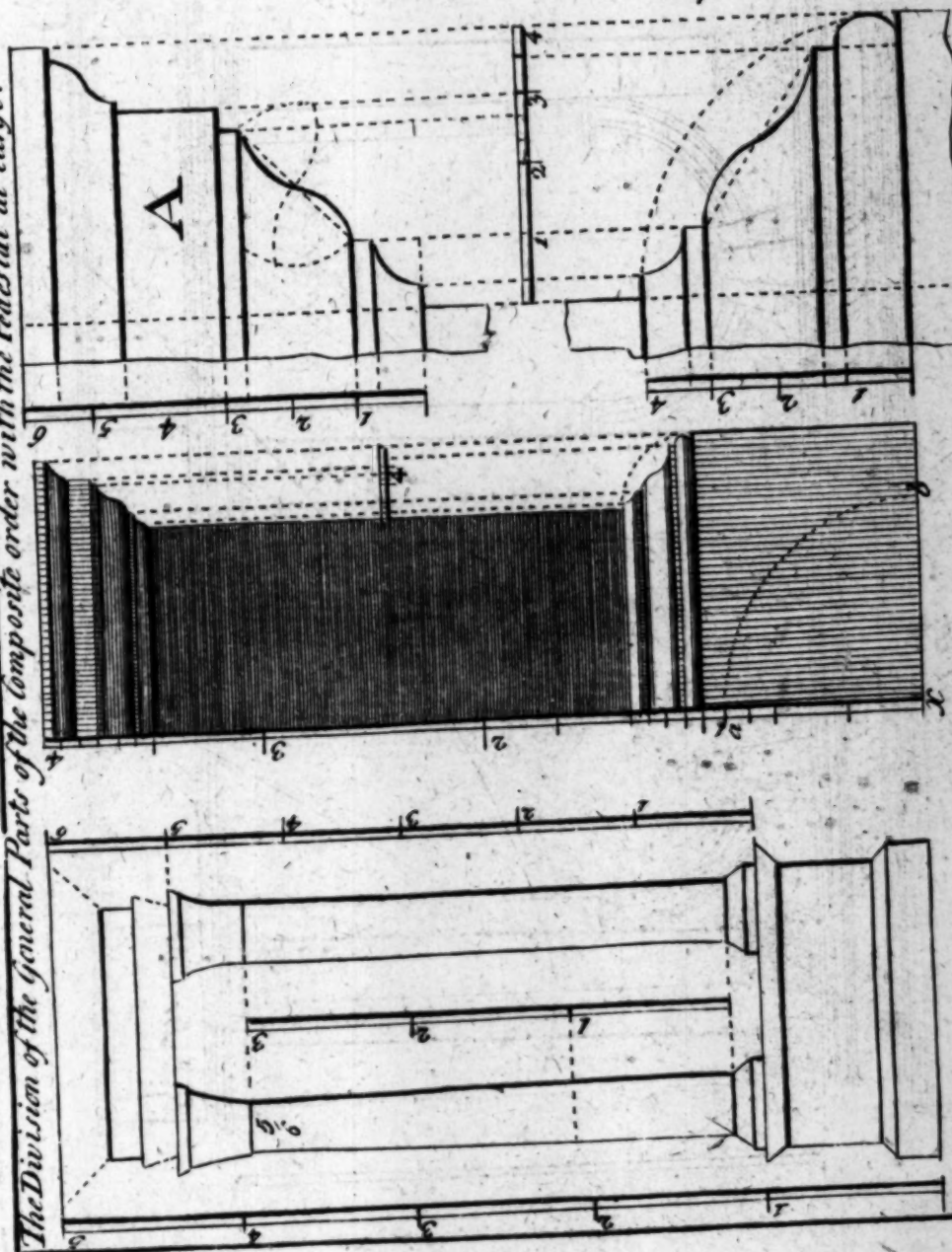
B Langley Invent

T

Corinthian Arcades

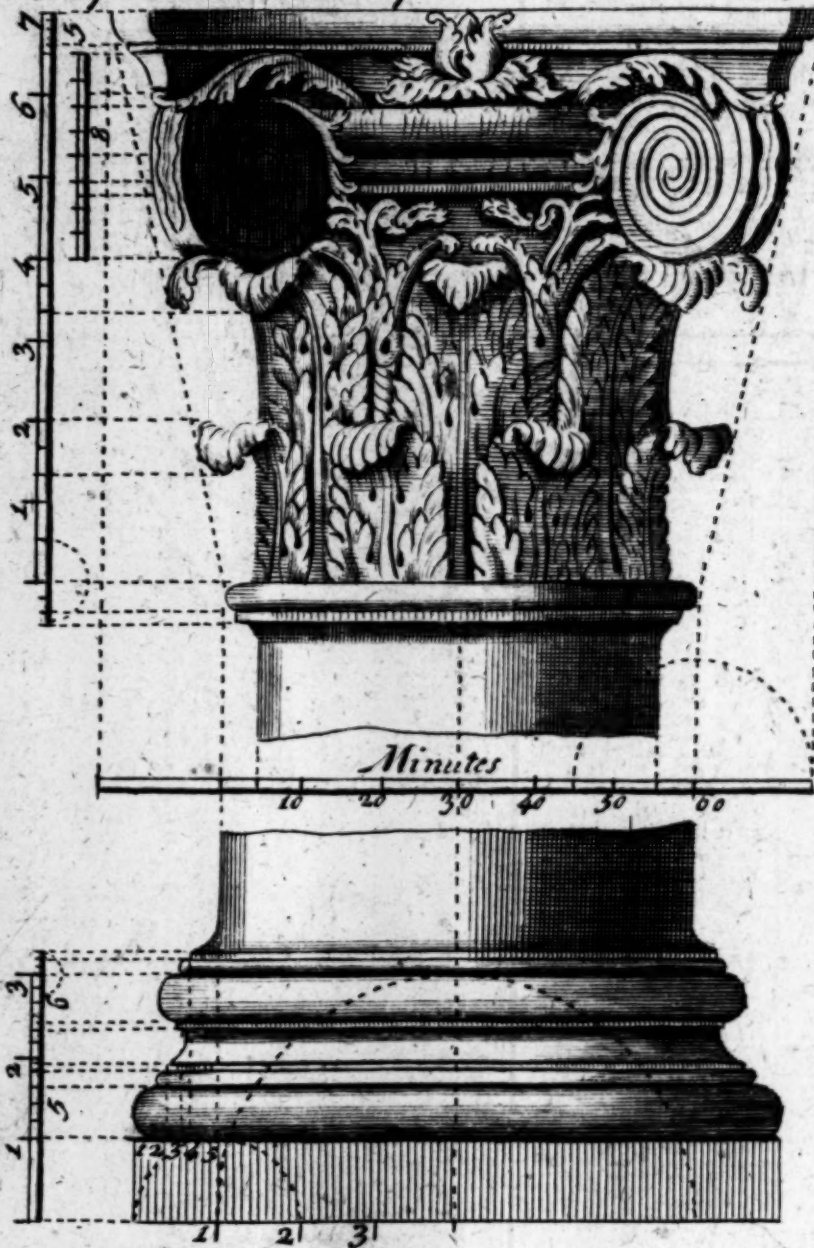


The Division of the General Parts of the Composite order with the Pedestal at large.



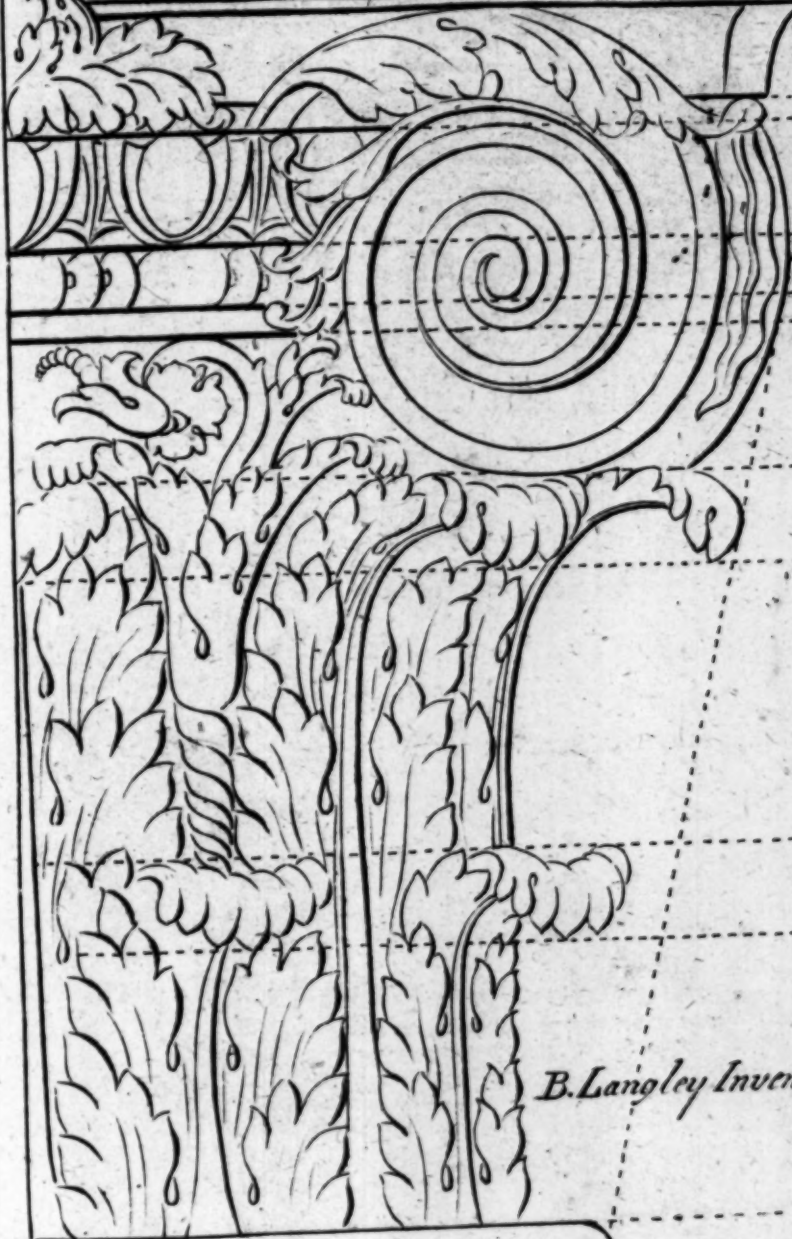
B. Langley Invent

The Composite Base & capital to a Column Pl 58



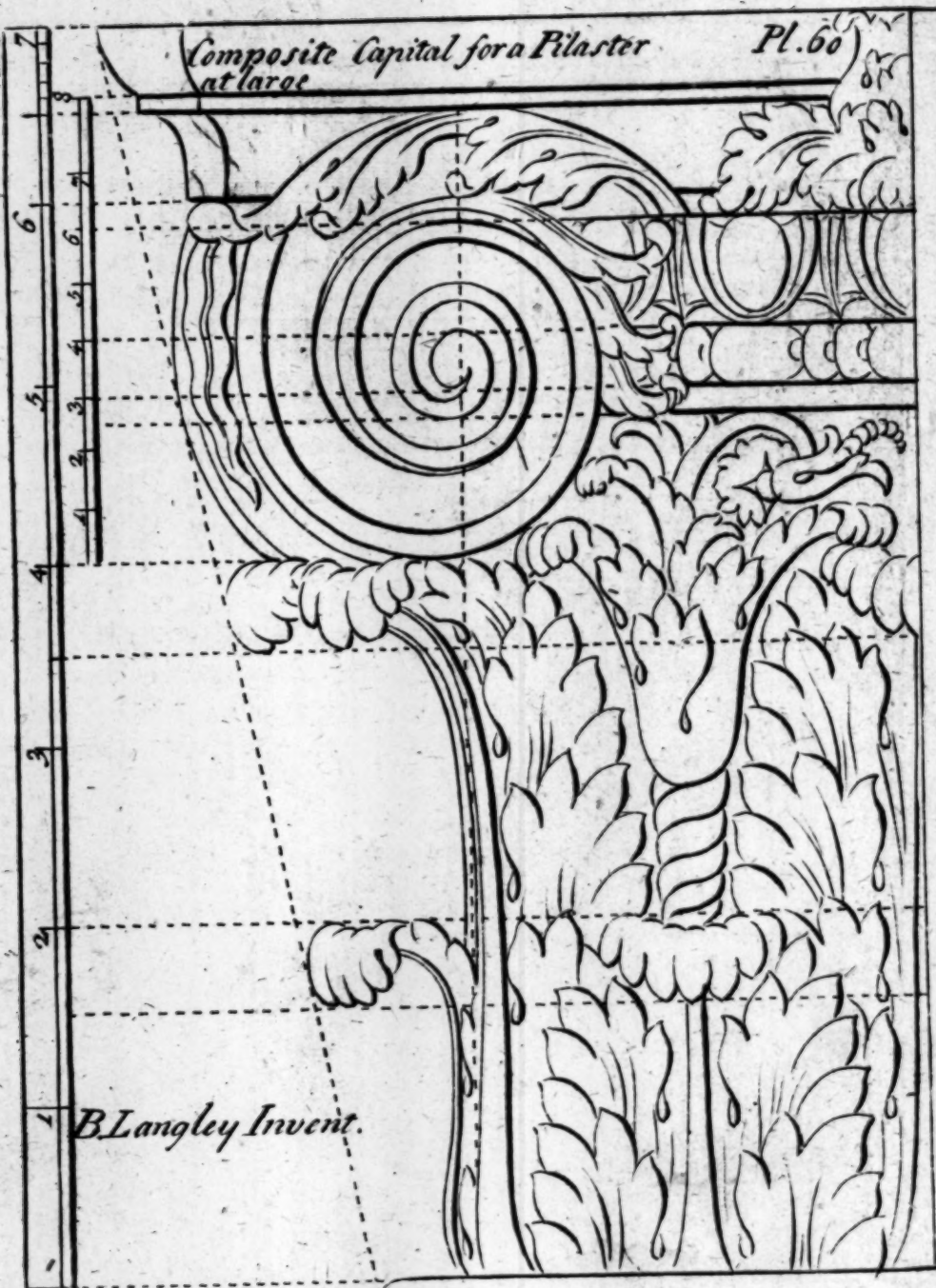
*Composite Capital for a Column
at large*

Pl. 59



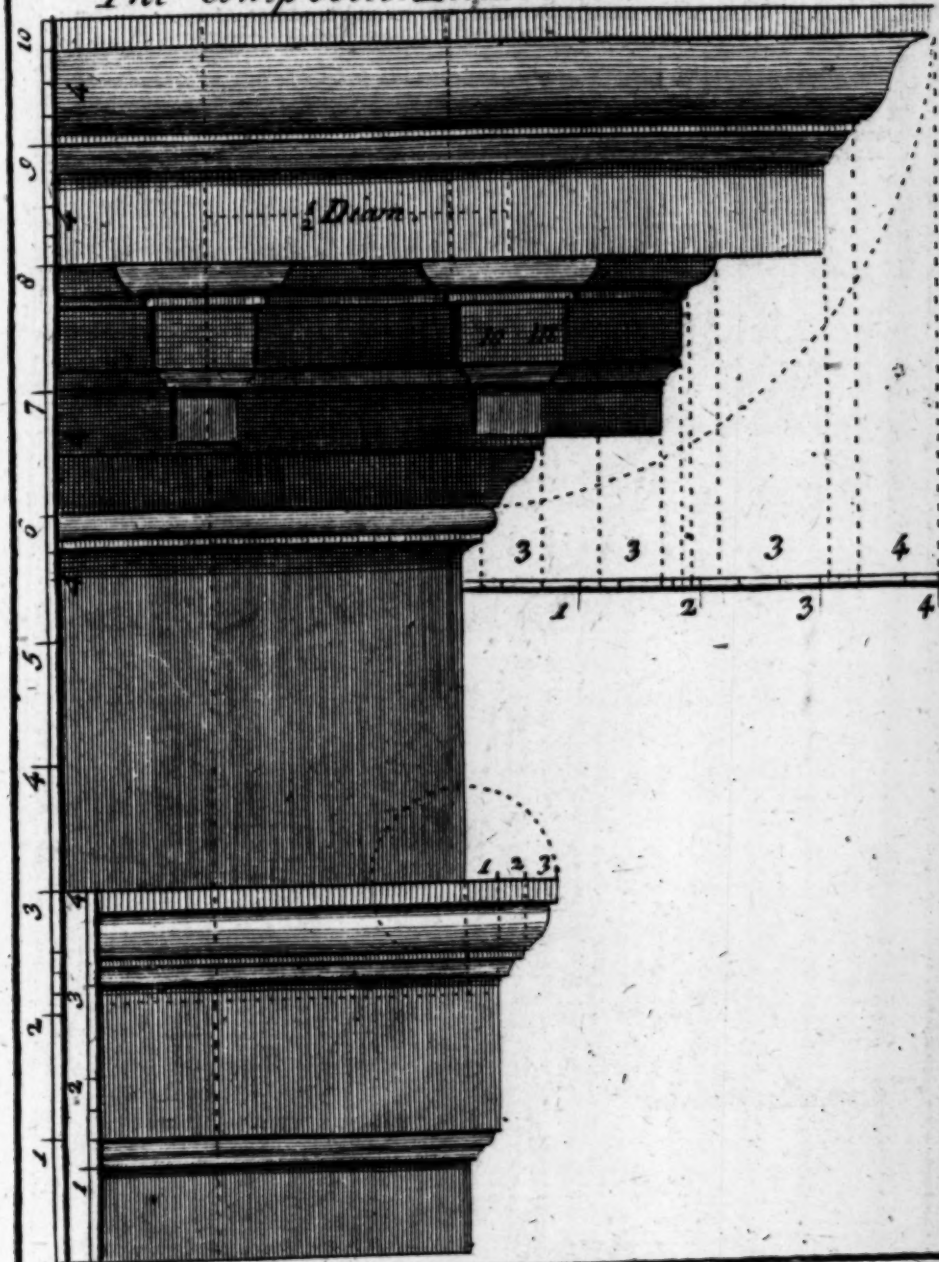
B. Langley Invent.

U



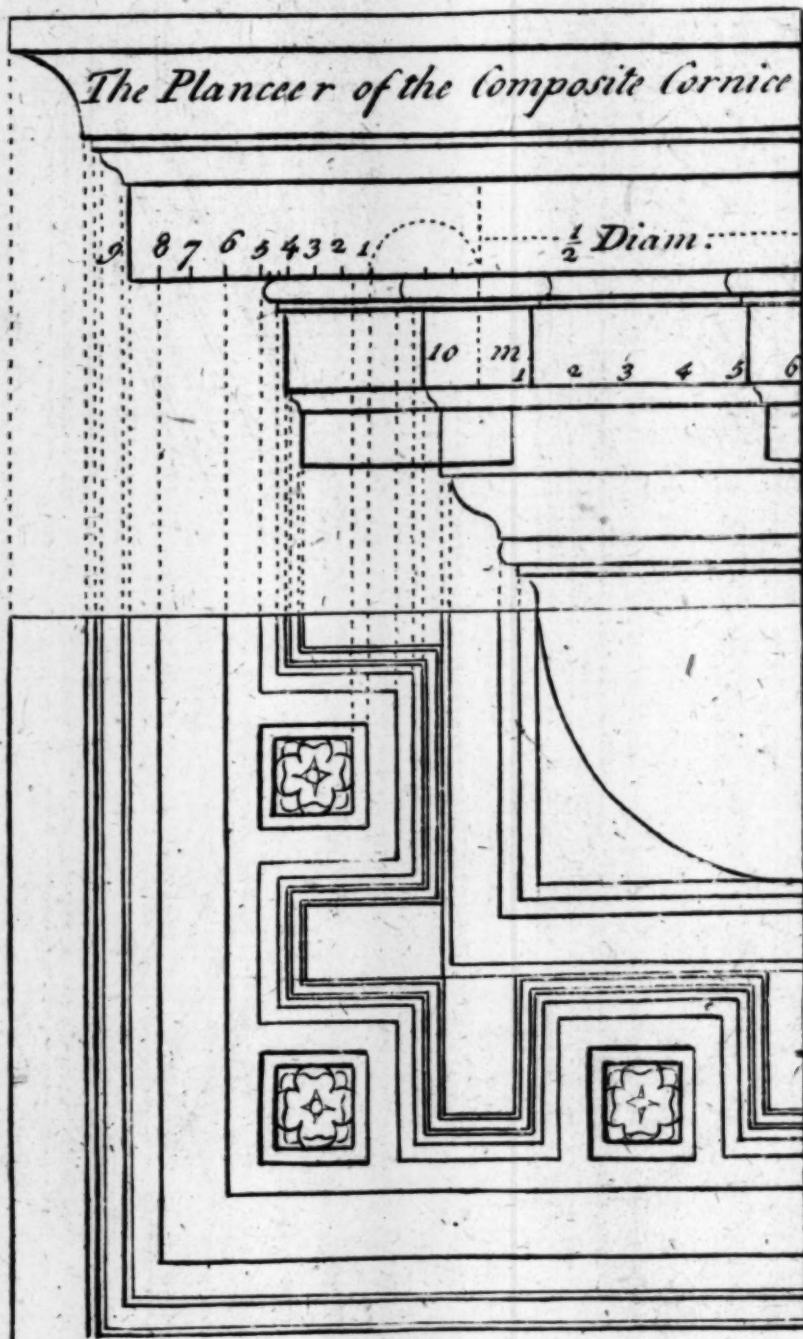
The Composite Entablature

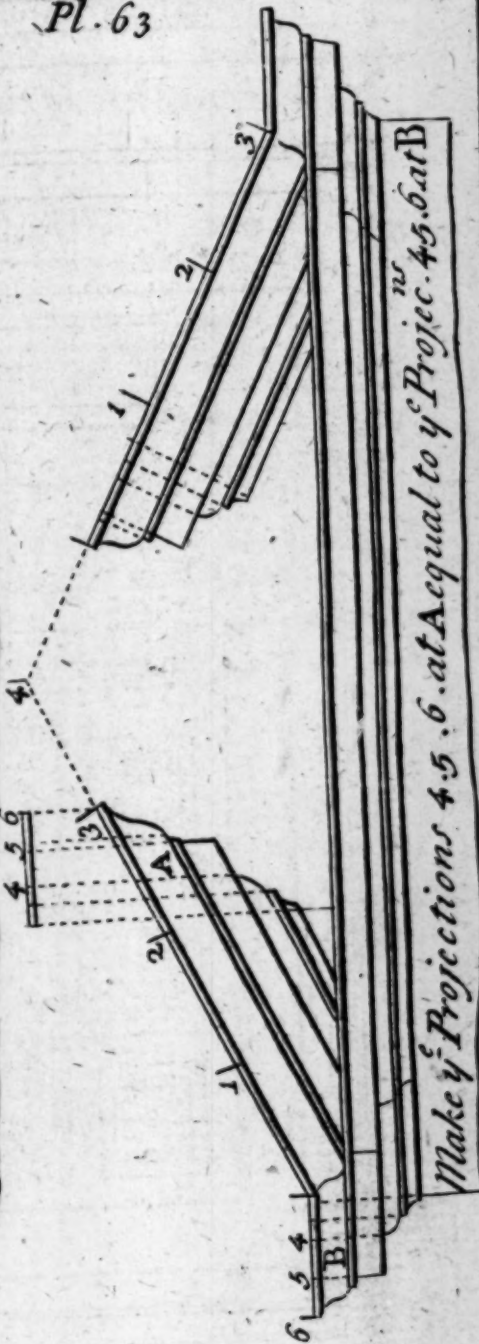
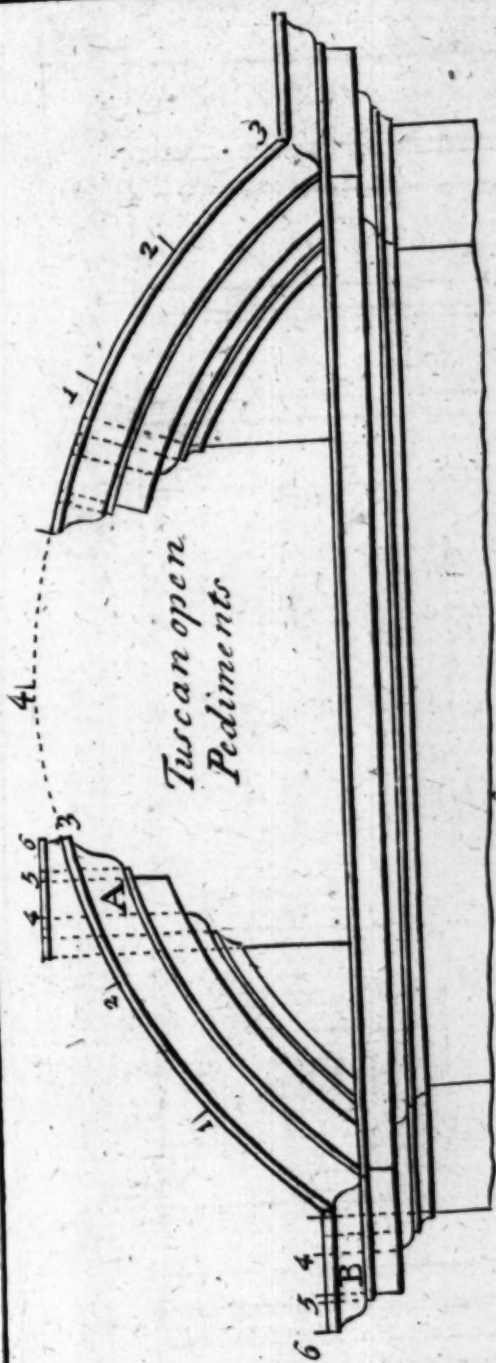
Pl. 61



X

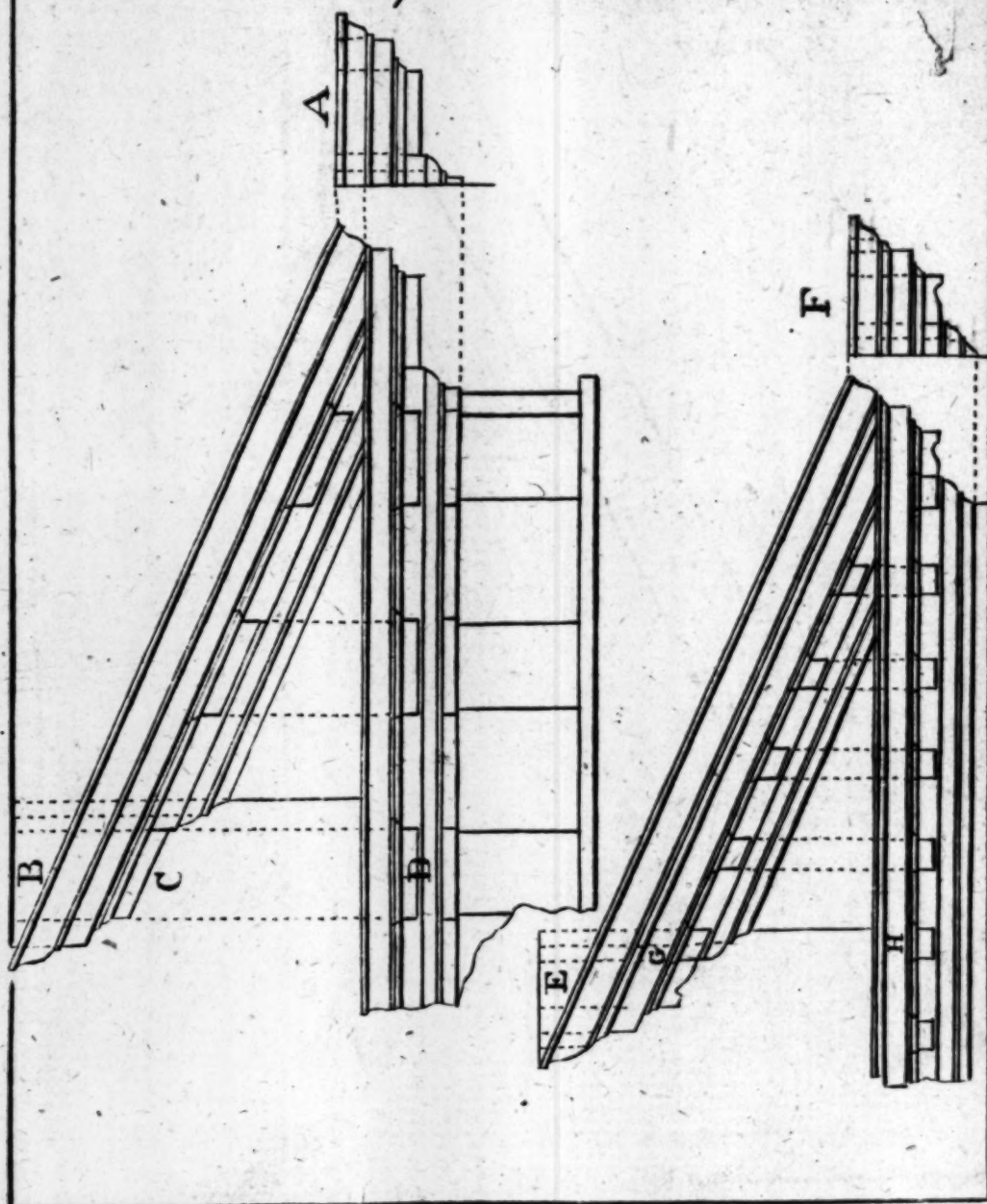
The Planceer of the Composite Cornice



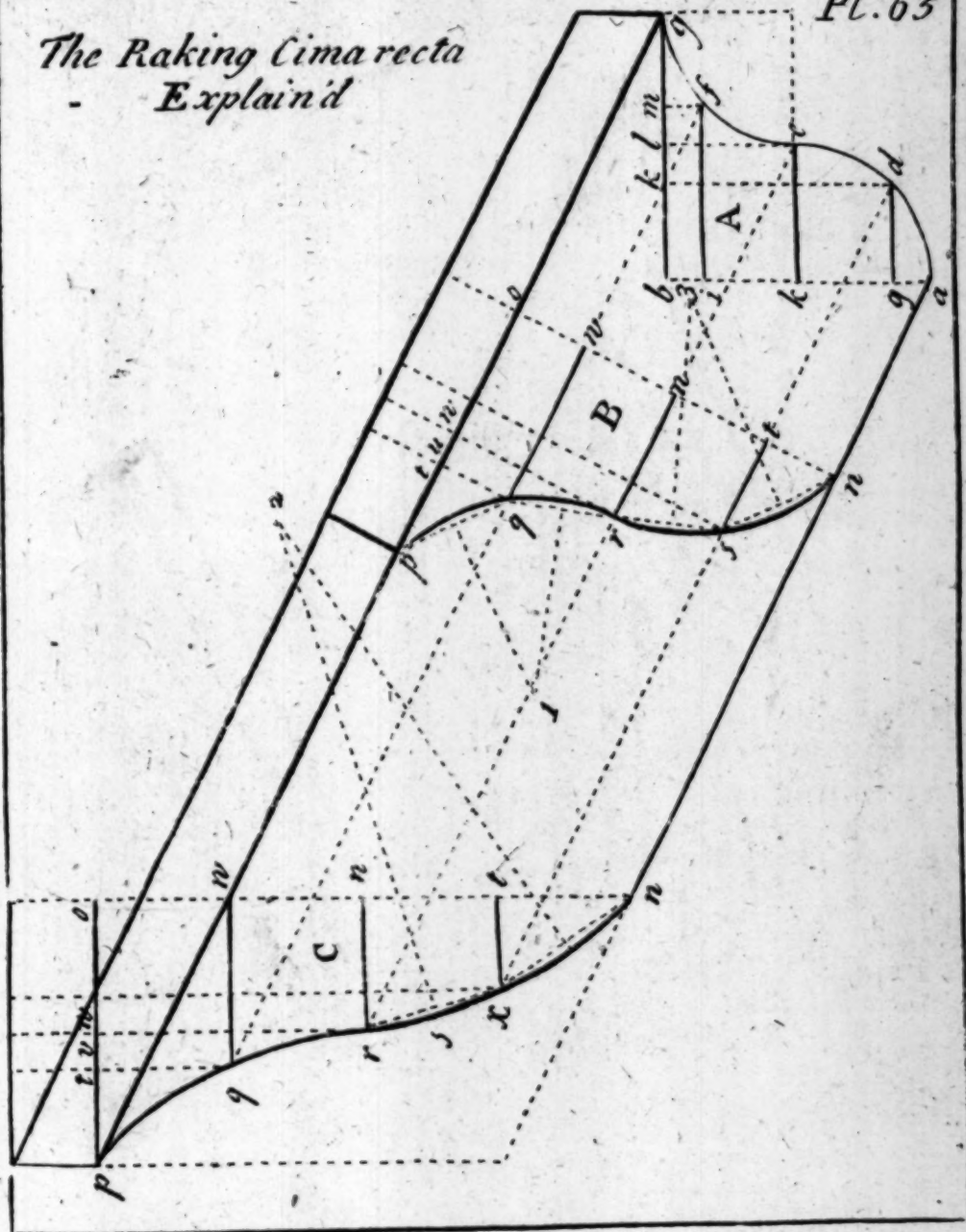


Make y^c Projections 4.5.6. at Aequal to y^c Projec. 43.6 at B

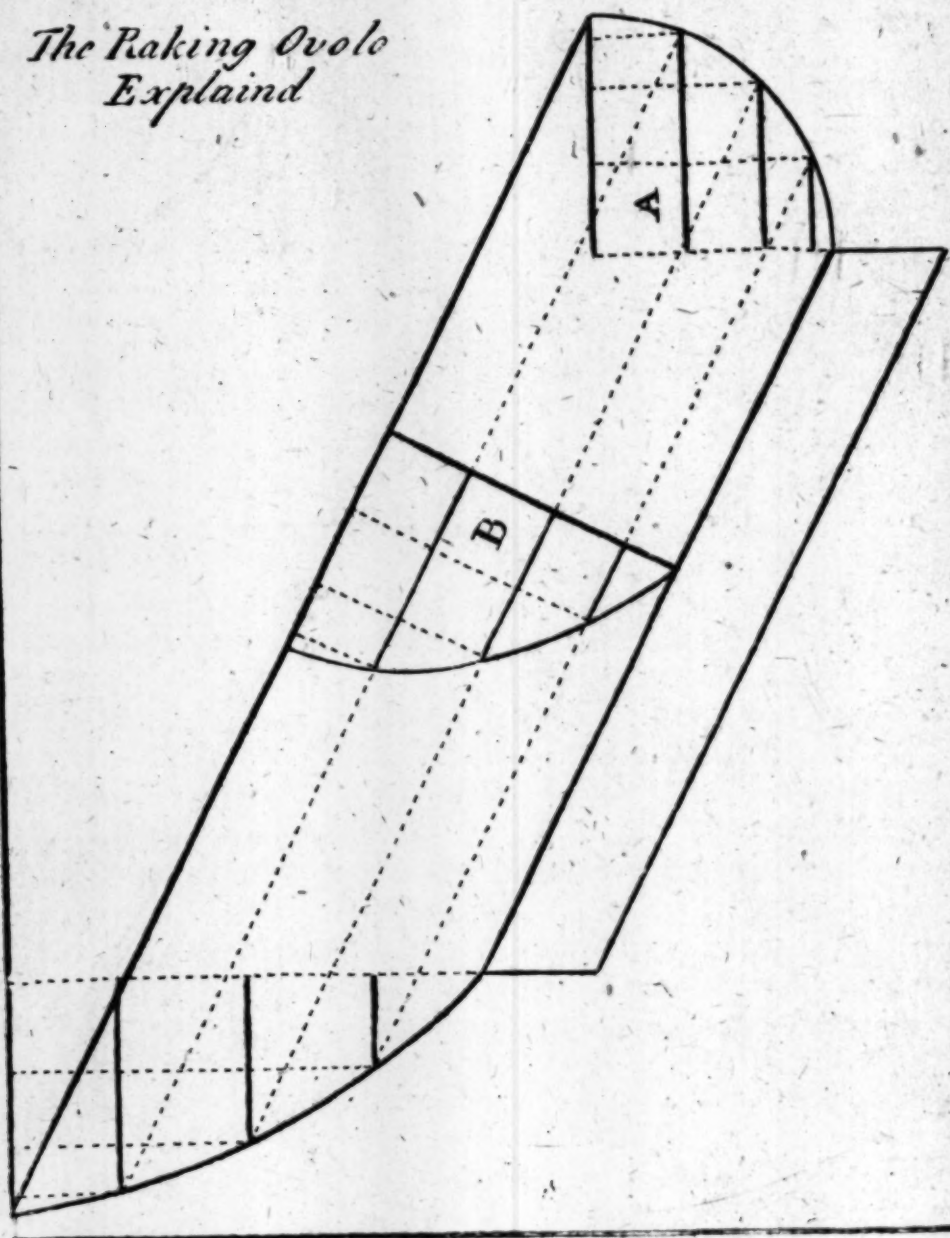
The Dorick & Ionick open Pediment Explain'd Pl. 64



The Raking Cima recta
Explain'd

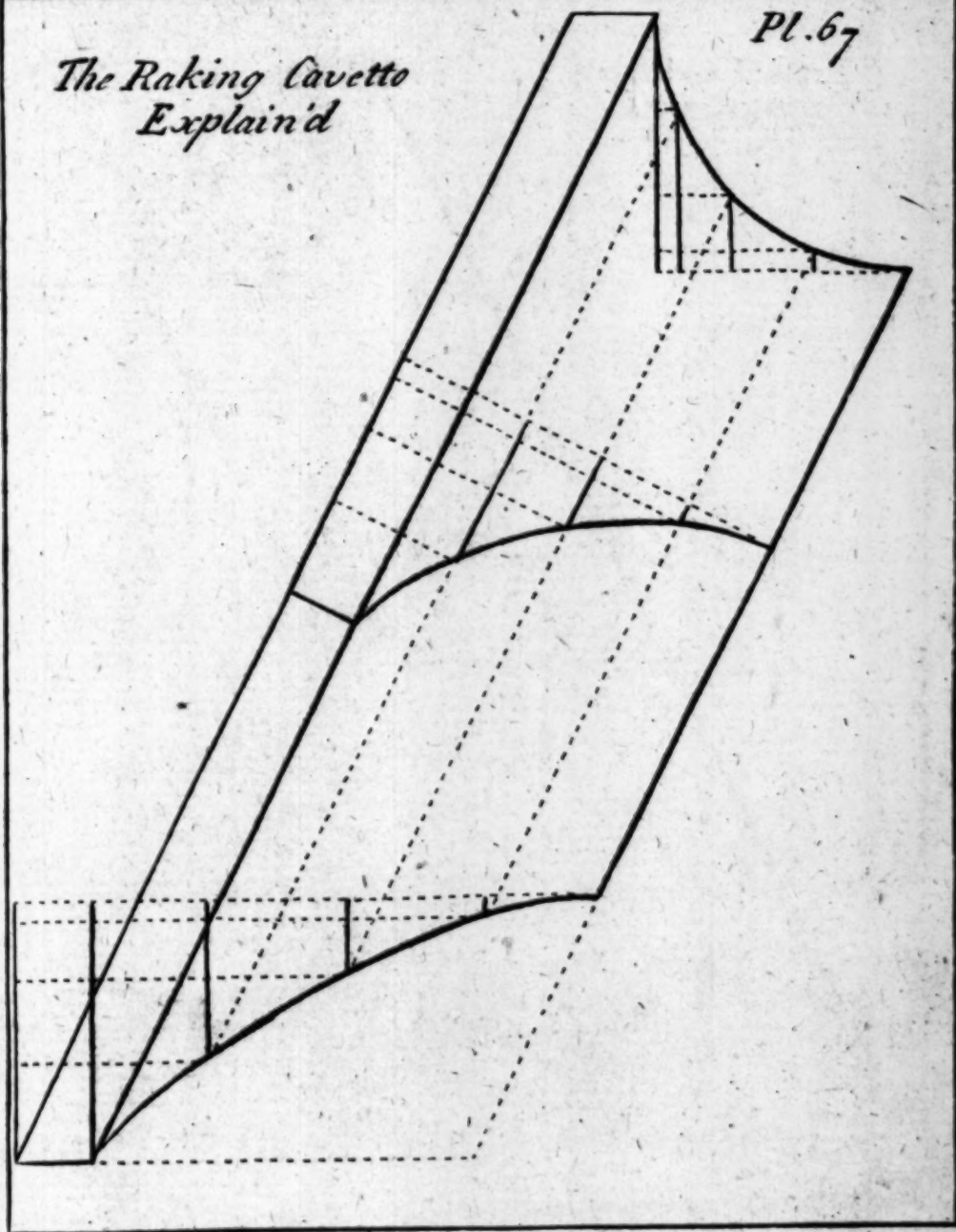


*The Raking Ovolo
Explained*

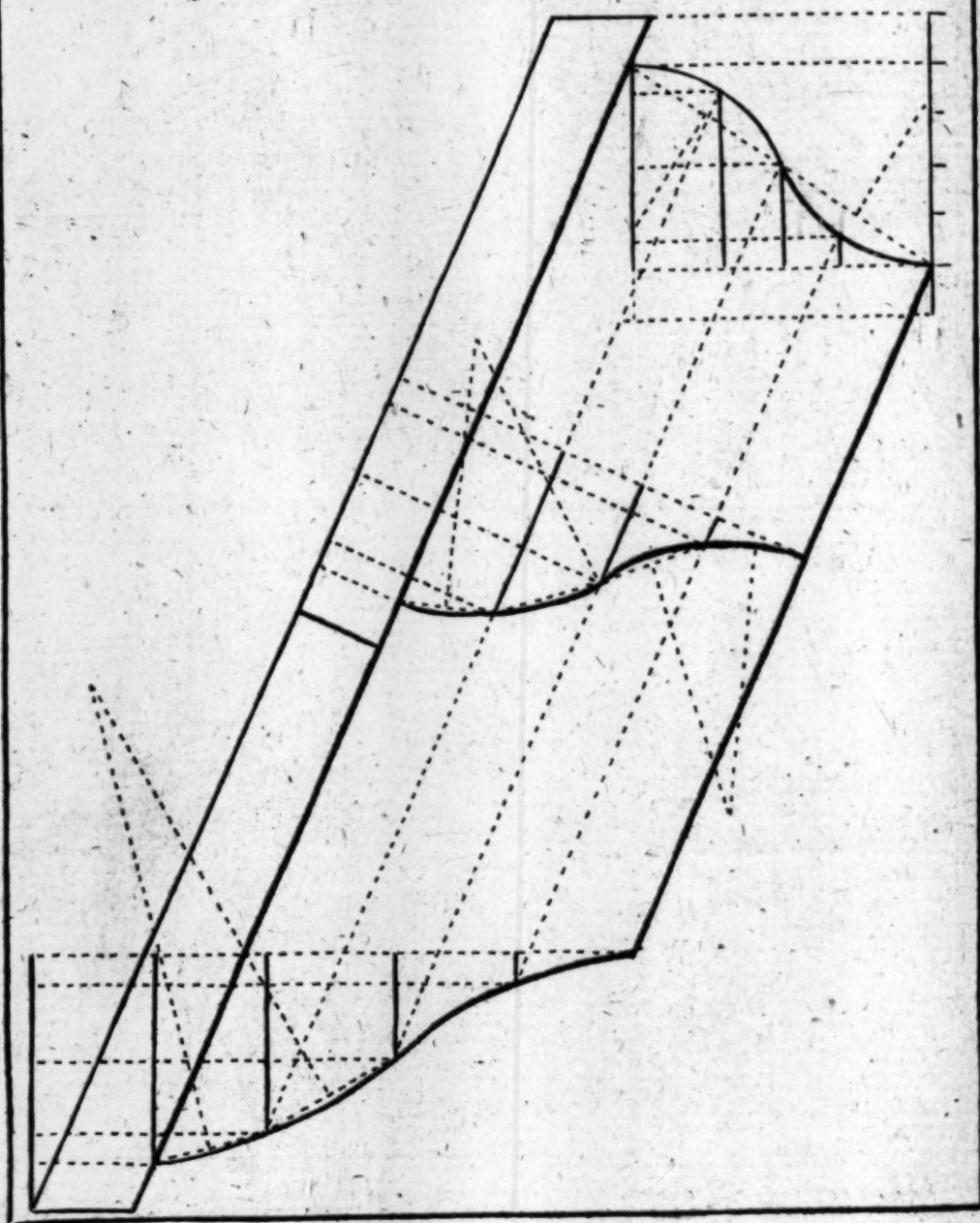


The Raking Cavetto
Explain'd

Pl. 67

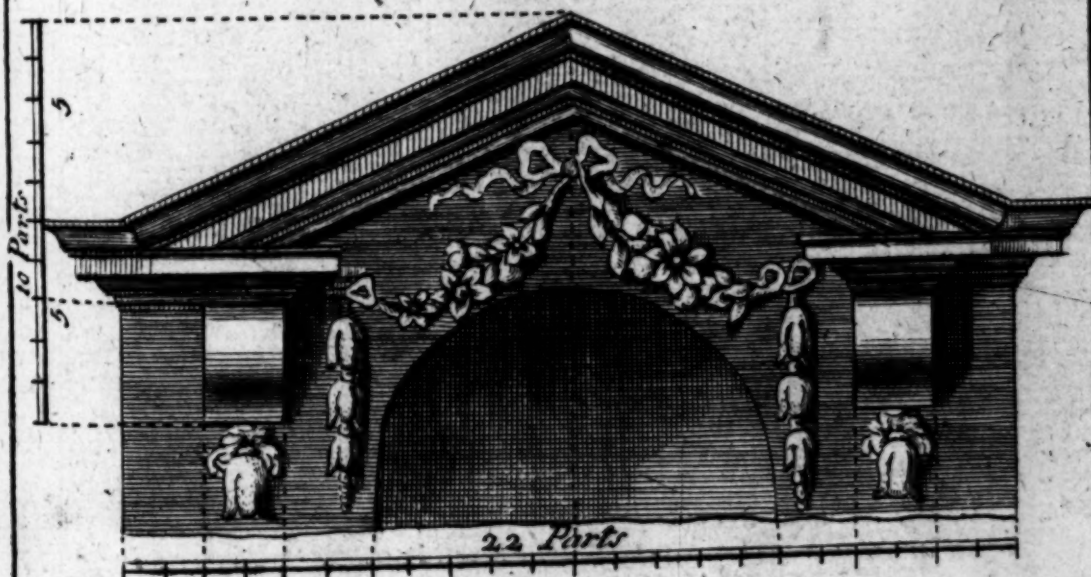


Z

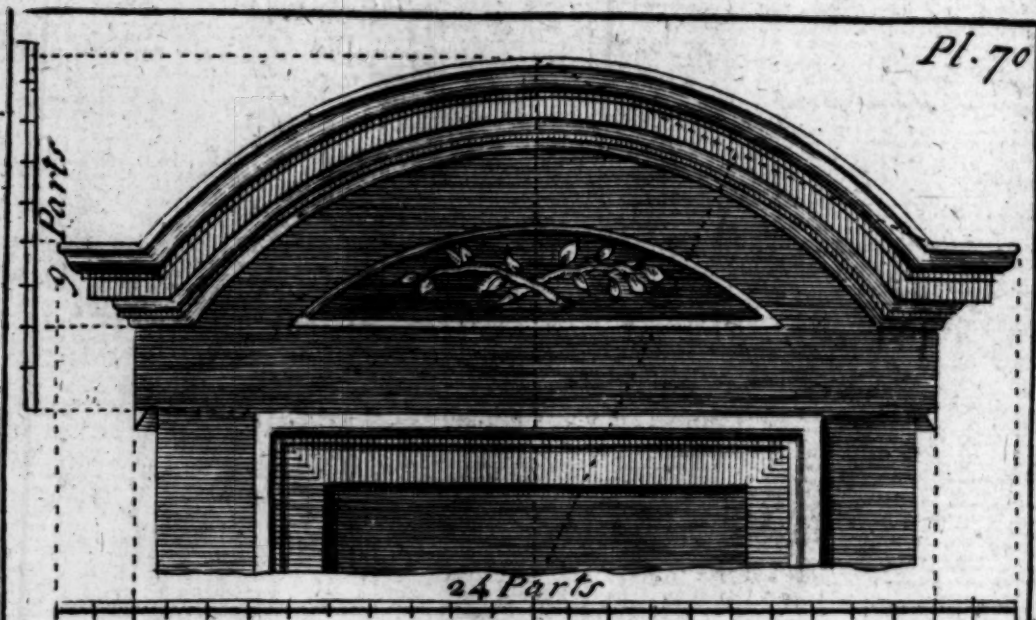




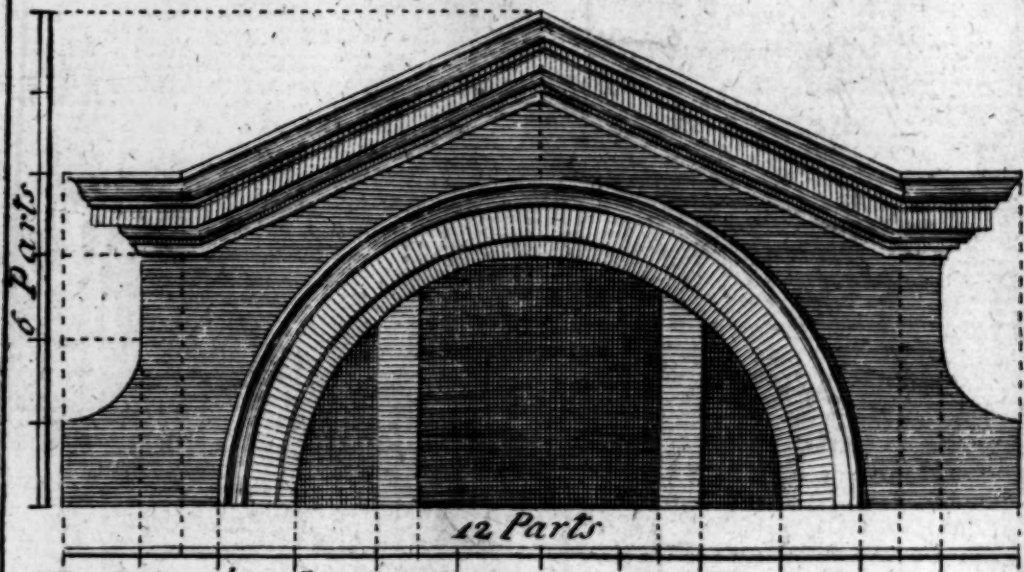
Open Bed mould Pedim^t



B. Langley Invent

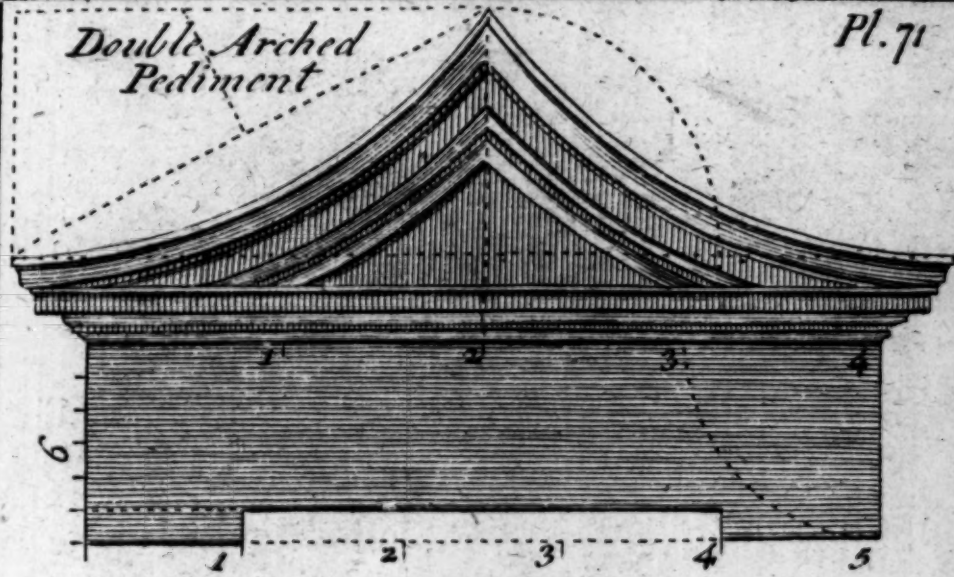


Pediments of continued Cornices

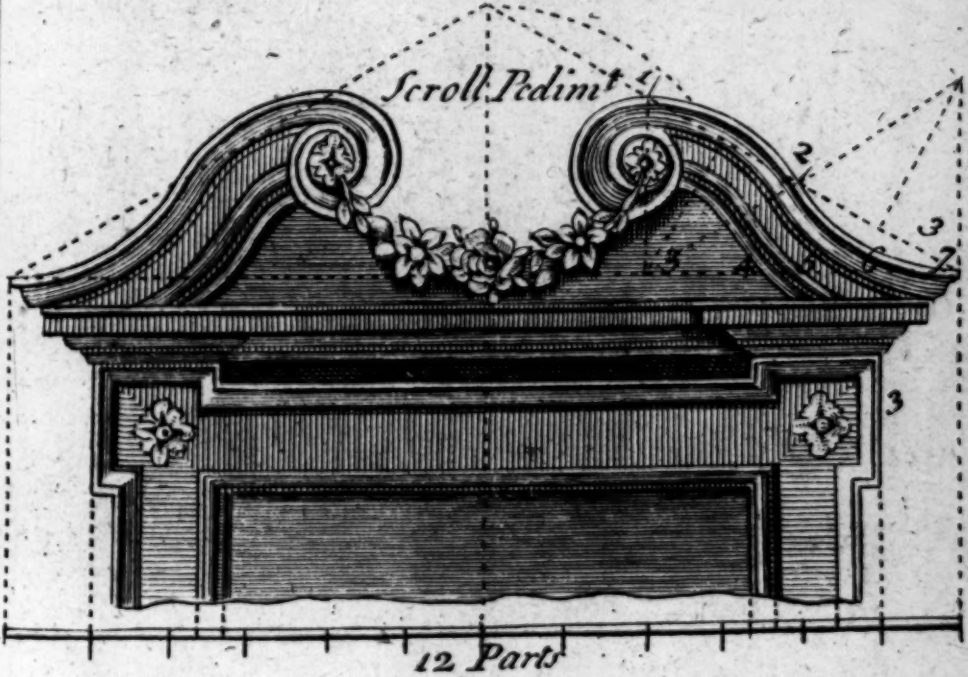


B Langley Invent

Double Arched
Pediment



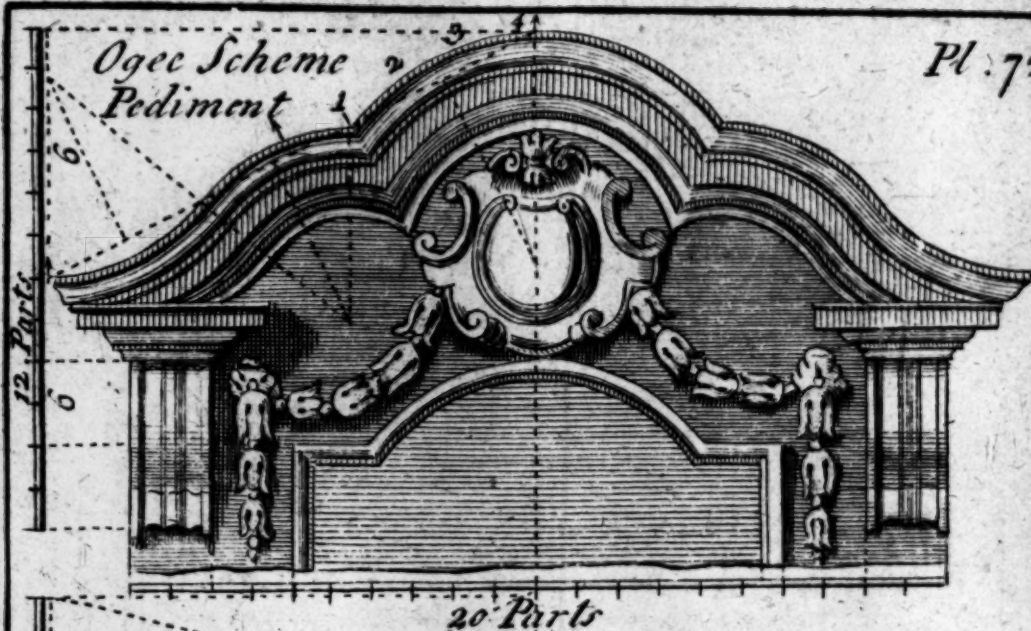
Scroll Pediment



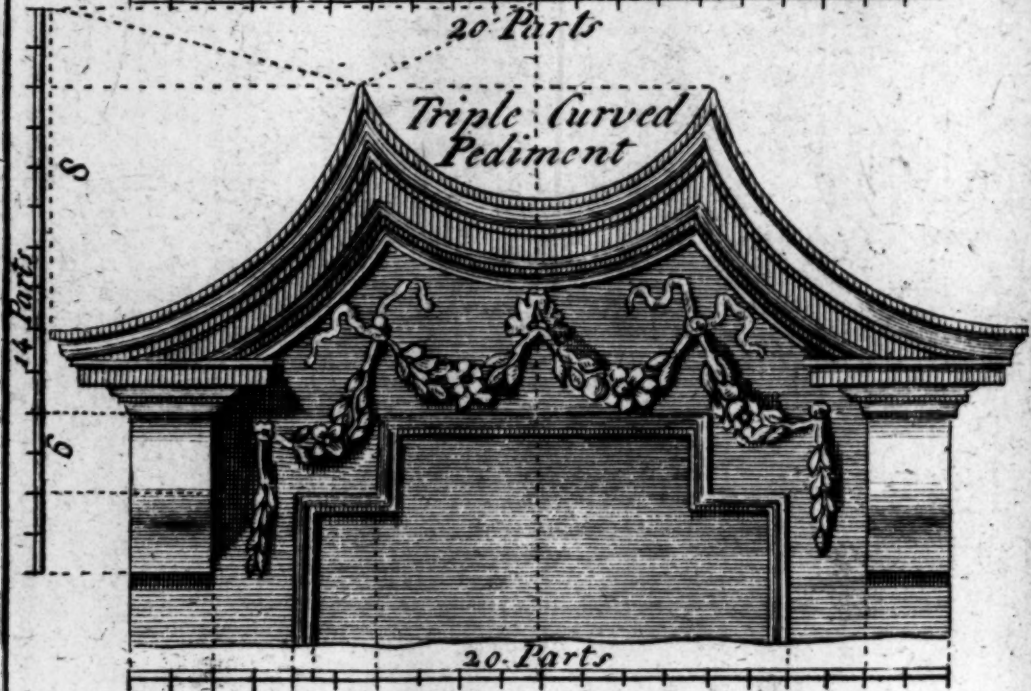
12 Parts

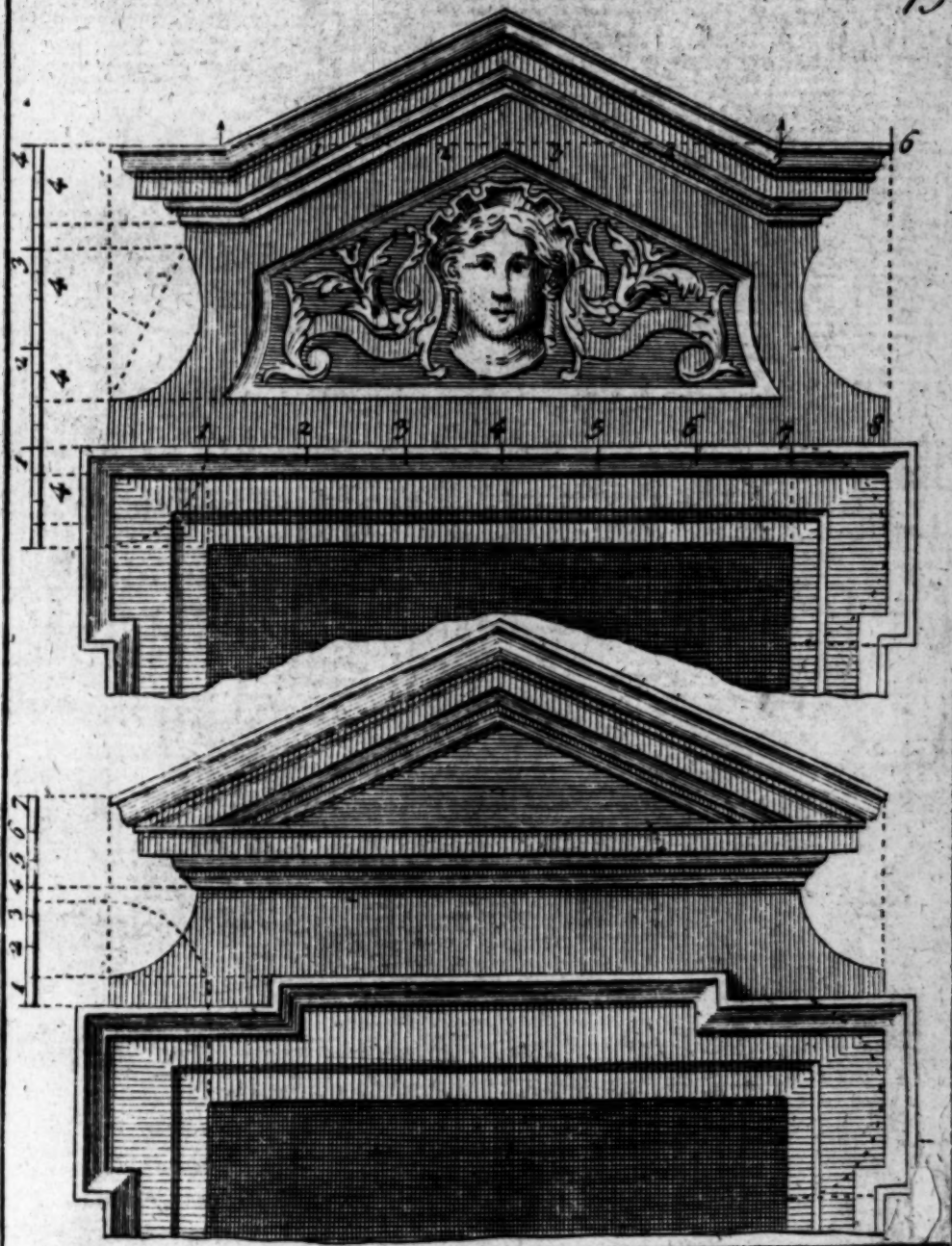
A a

Ogee Scheme
Pediment

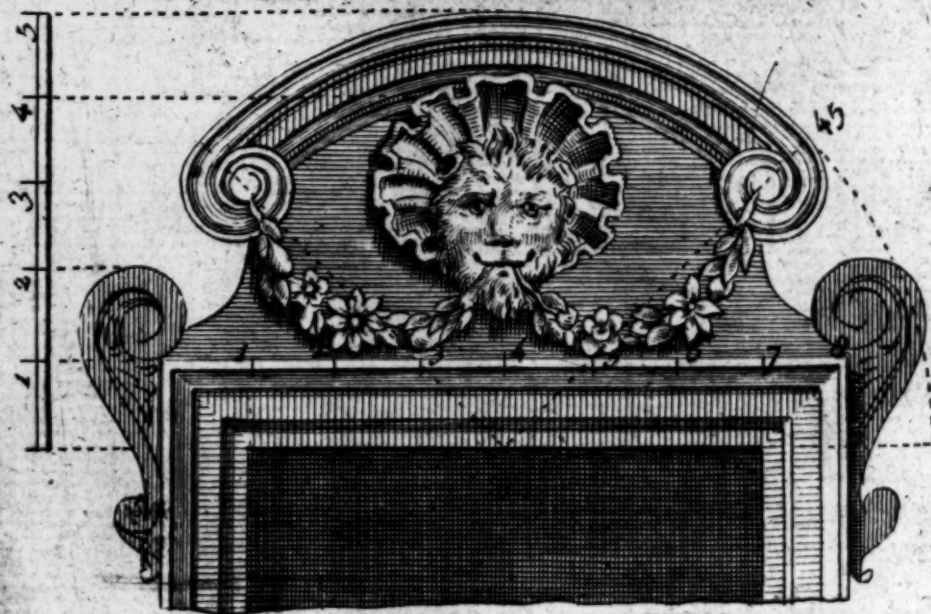


Triple Curved
Pediment



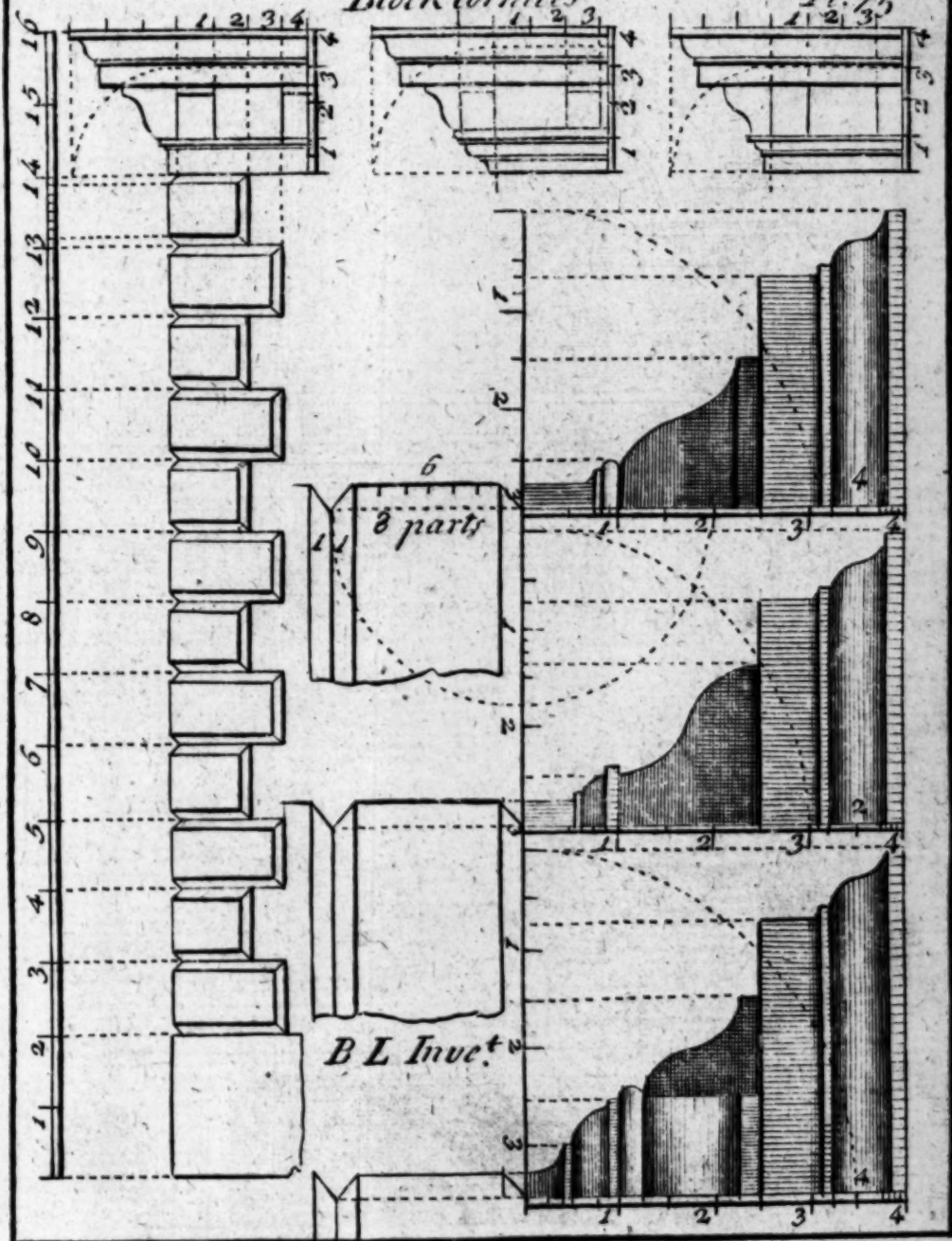


Bb

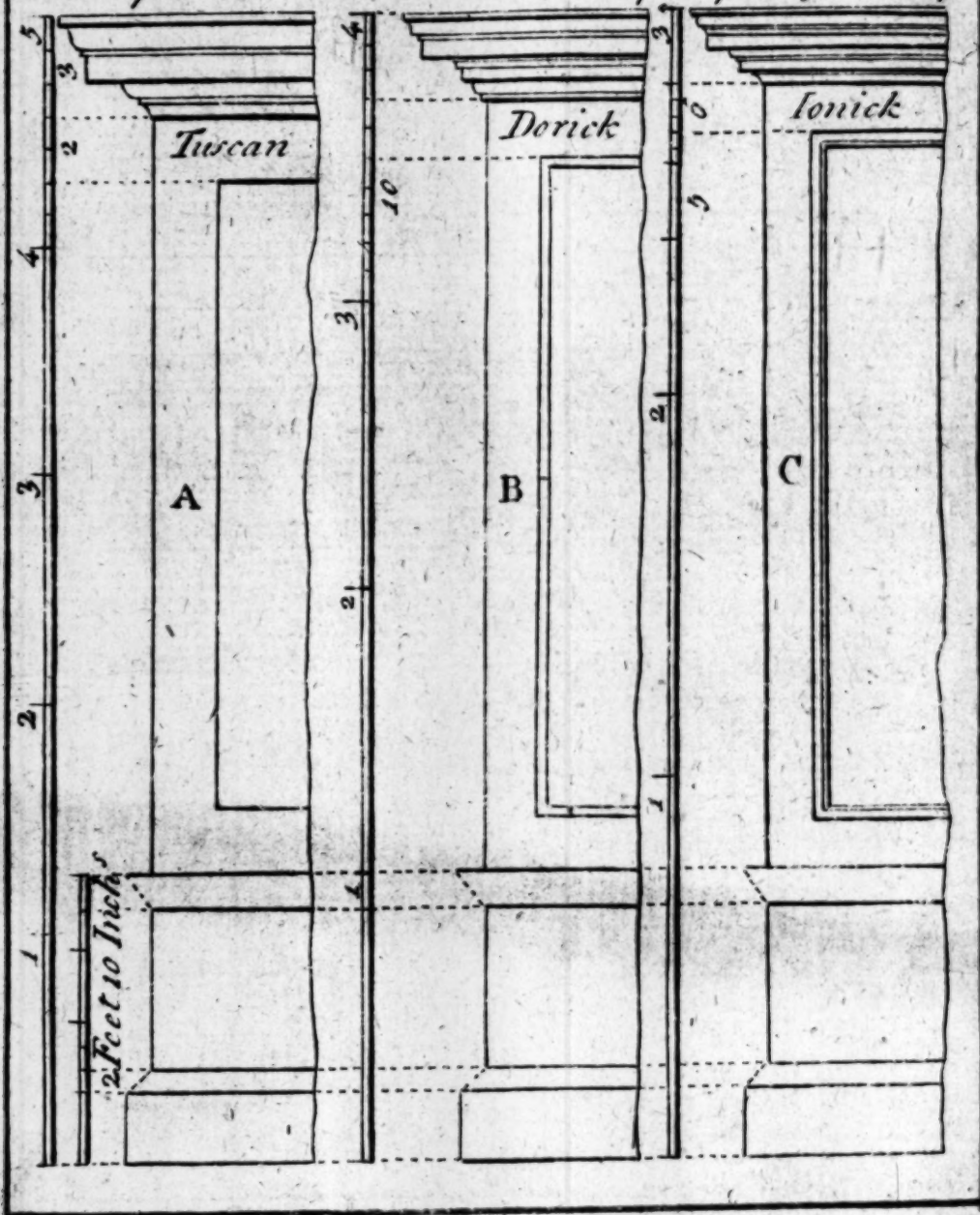


Block Cornices

Pl. 75

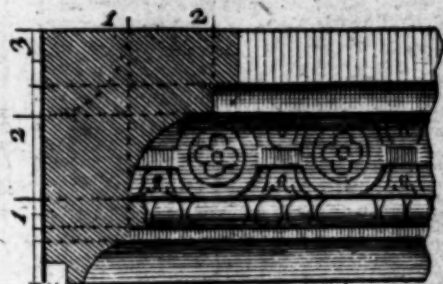
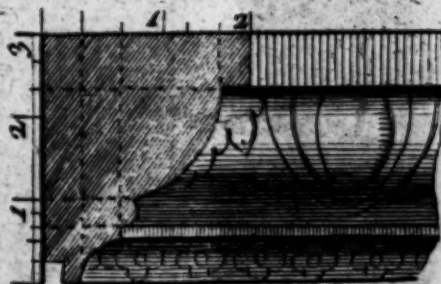
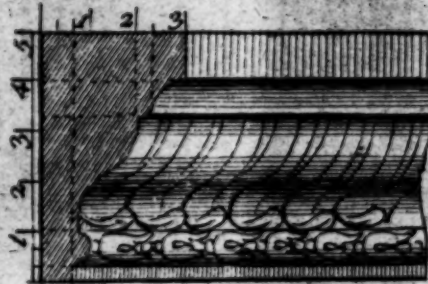
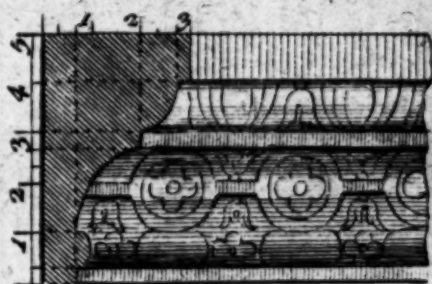
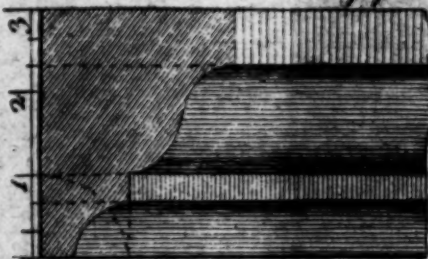


To Proportion Cornices to Rooms of any Height Pl. 76



Mouldings for Pannels &c.

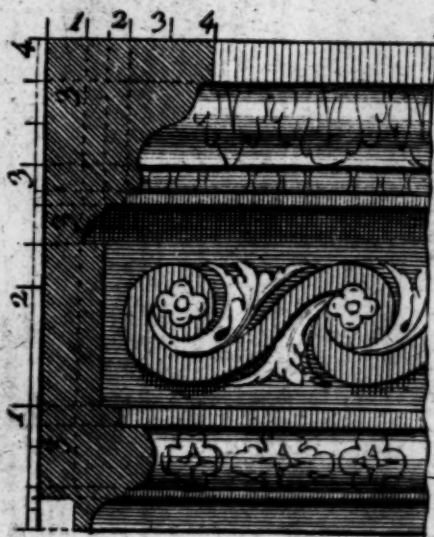
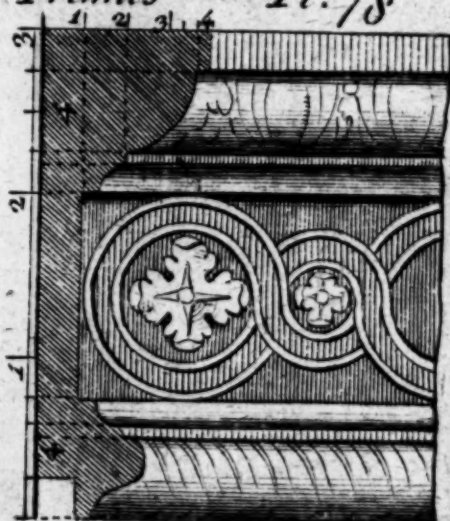
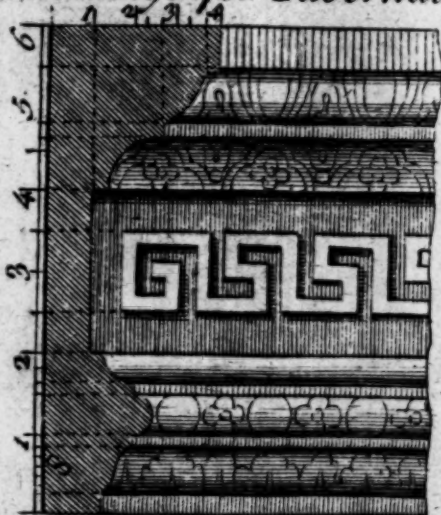
Pl. 77



Cc

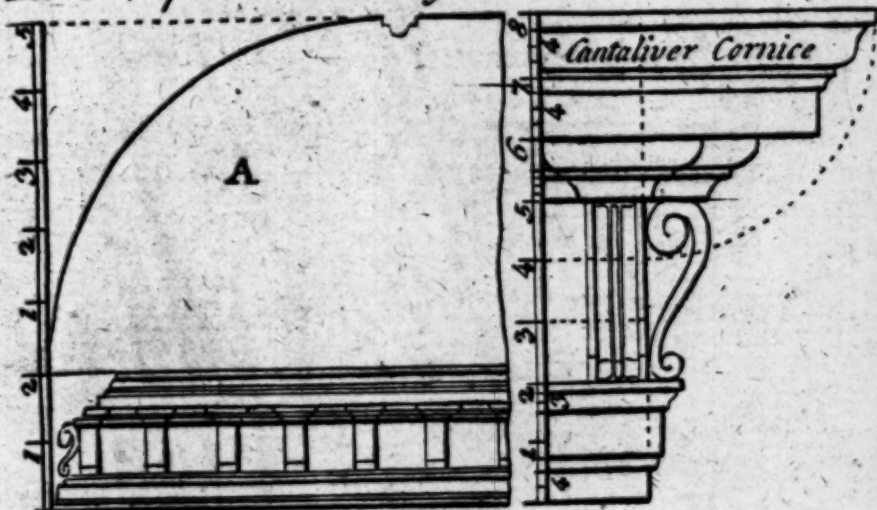
Mouldings for Tabernacle Frames

Pl. 78

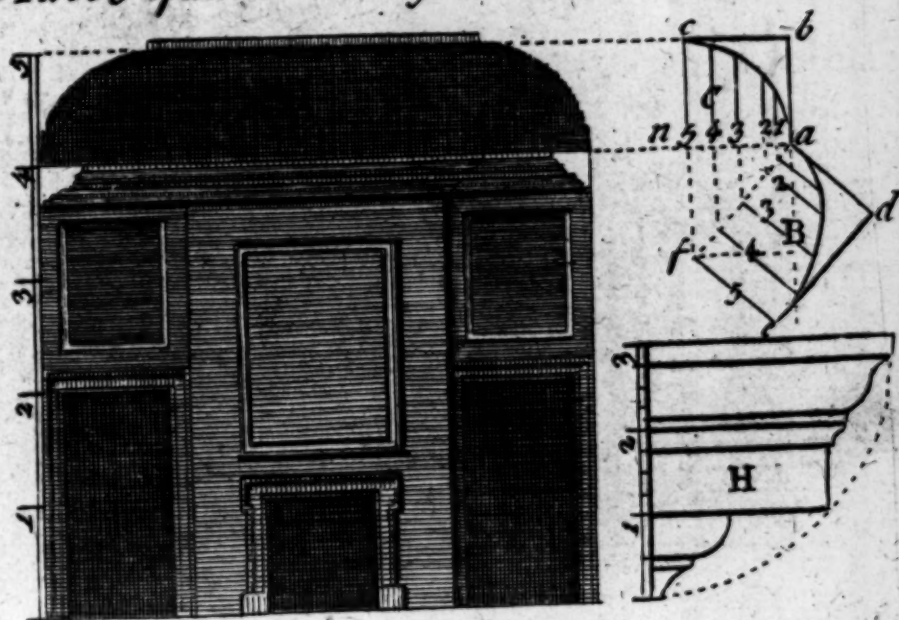


A Cove $\frac{1}{4}$ of the entire Height.

Pl. 79



A Cove $\frac{1}{3}$ of the entire Height

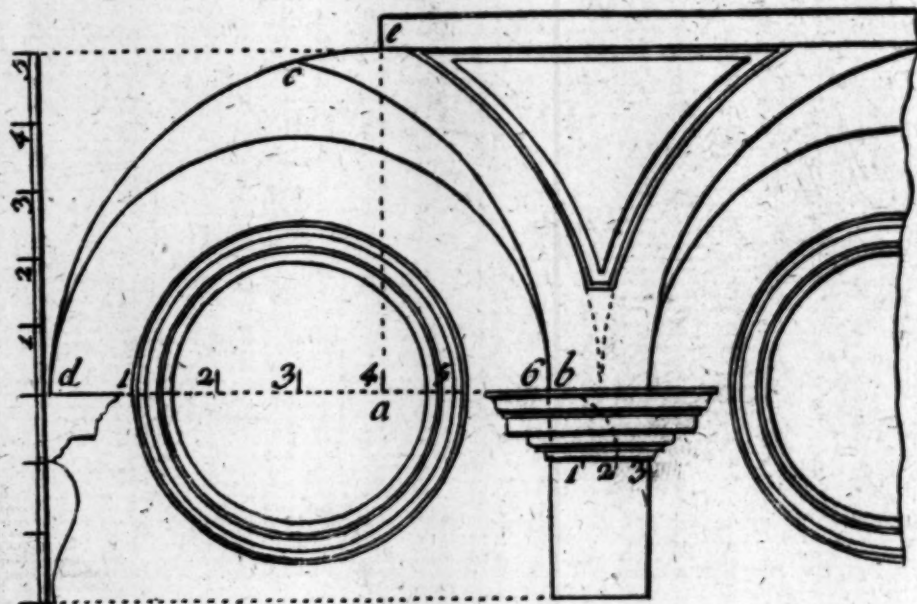
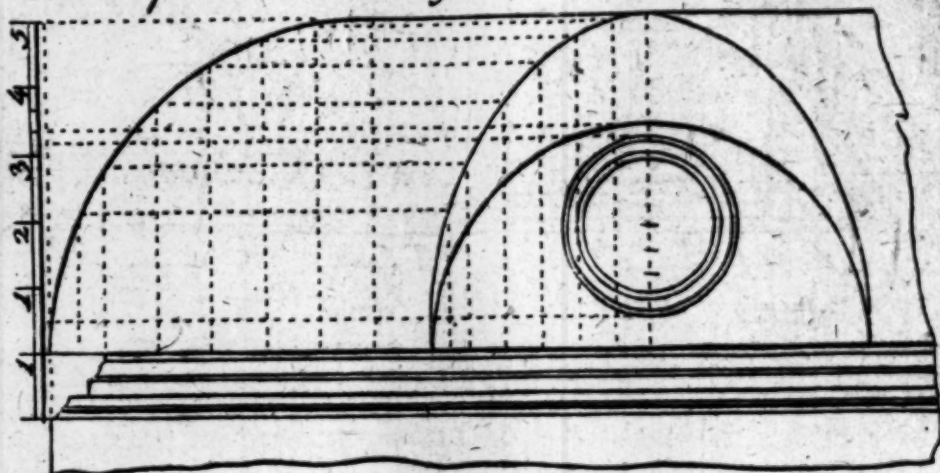


BL Inv.

Dd

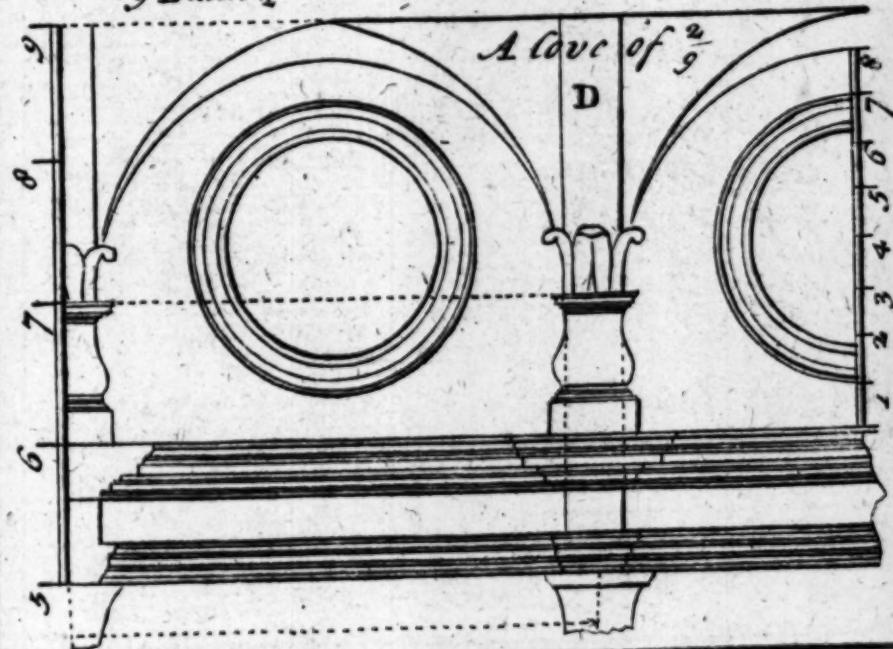
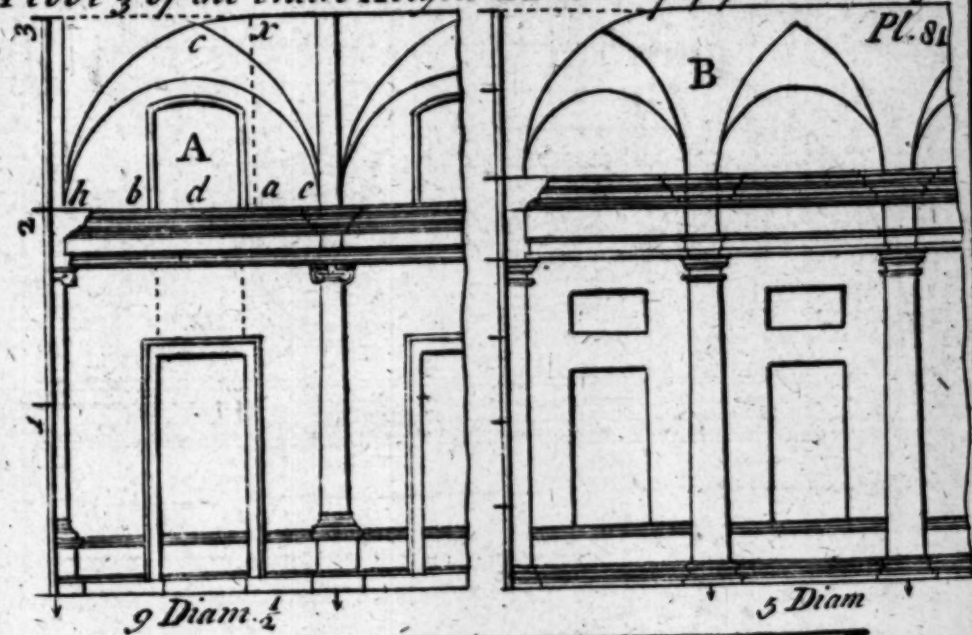
Covers $\frac{1}{6}$ of the entire Height

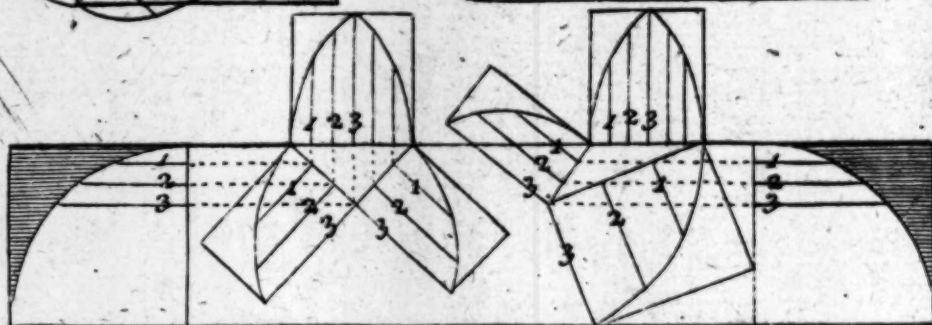
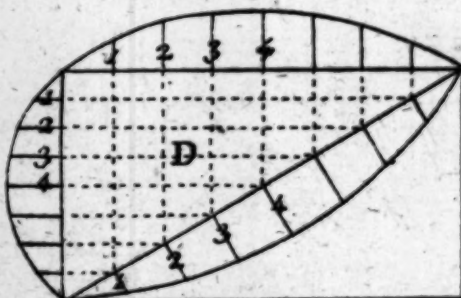
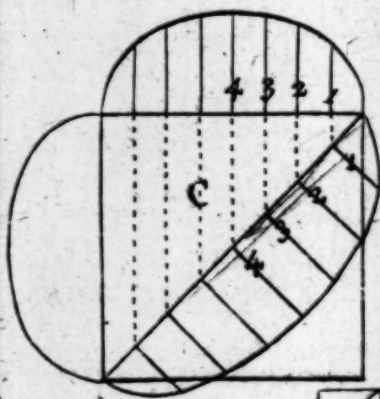
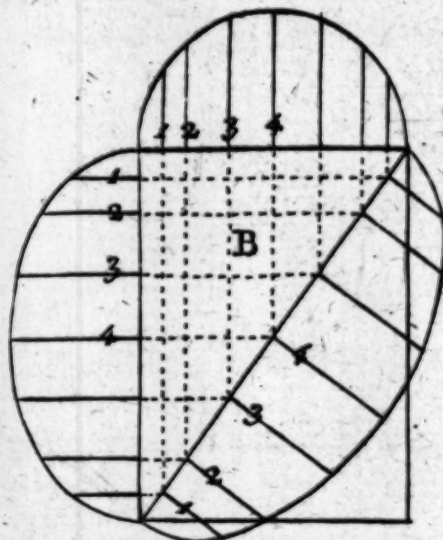
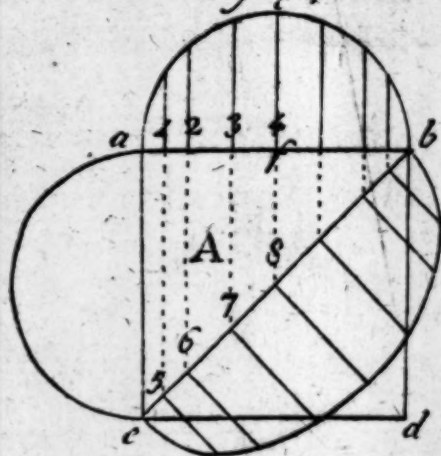
Pl. 20



BL Inv.

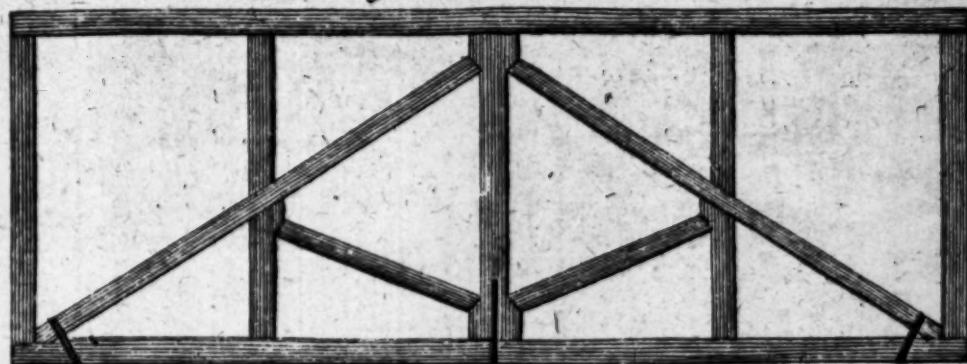
A Cove $\frac{1}{3}$ of the entire Height A Cove $\frac{2}{7}$ of y entire Height



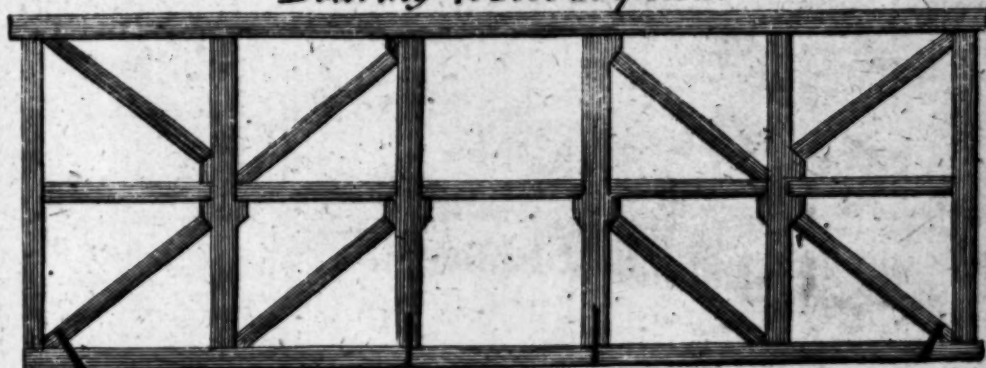


Truss'd Partitions

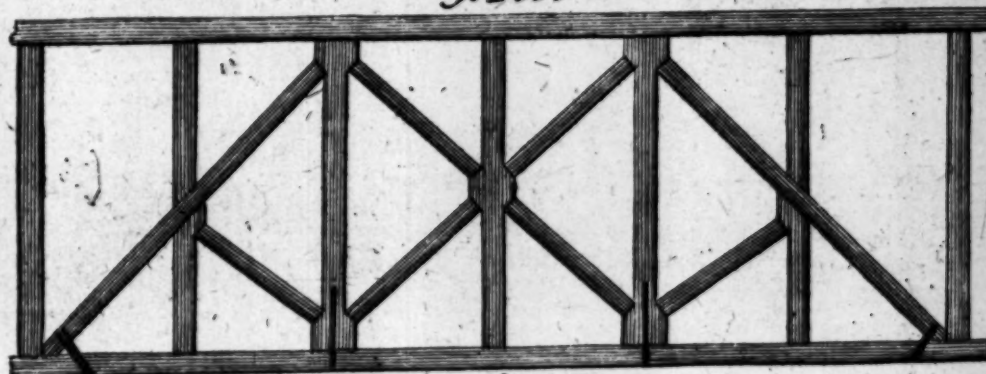
Pl 83



Bearing 40 Feet in y Clear



50 Feet



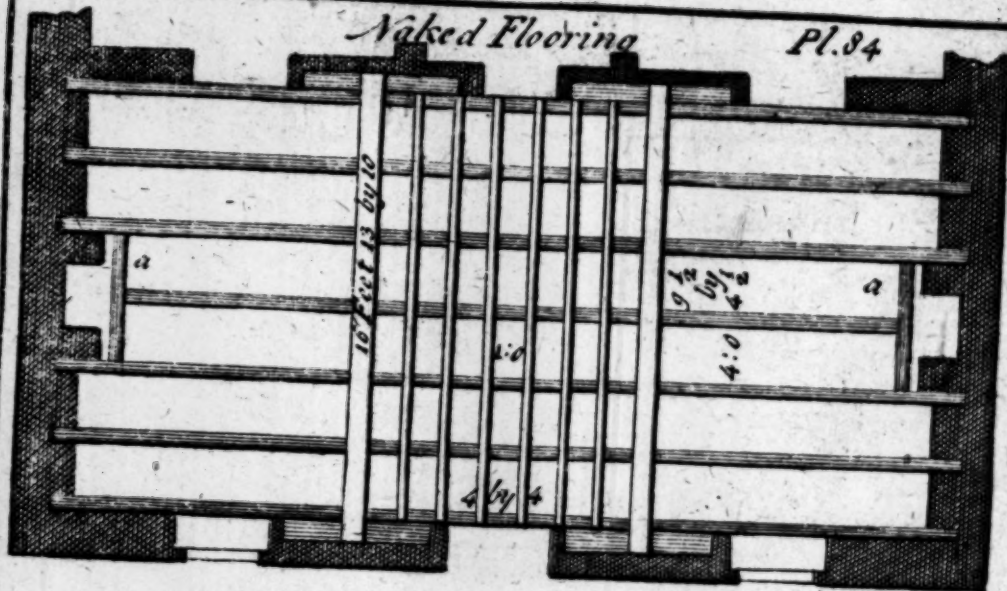
B.L.Inv.

60 Feet

Ee

Naked Flooring

Pl. 84



Truss'd

Girders



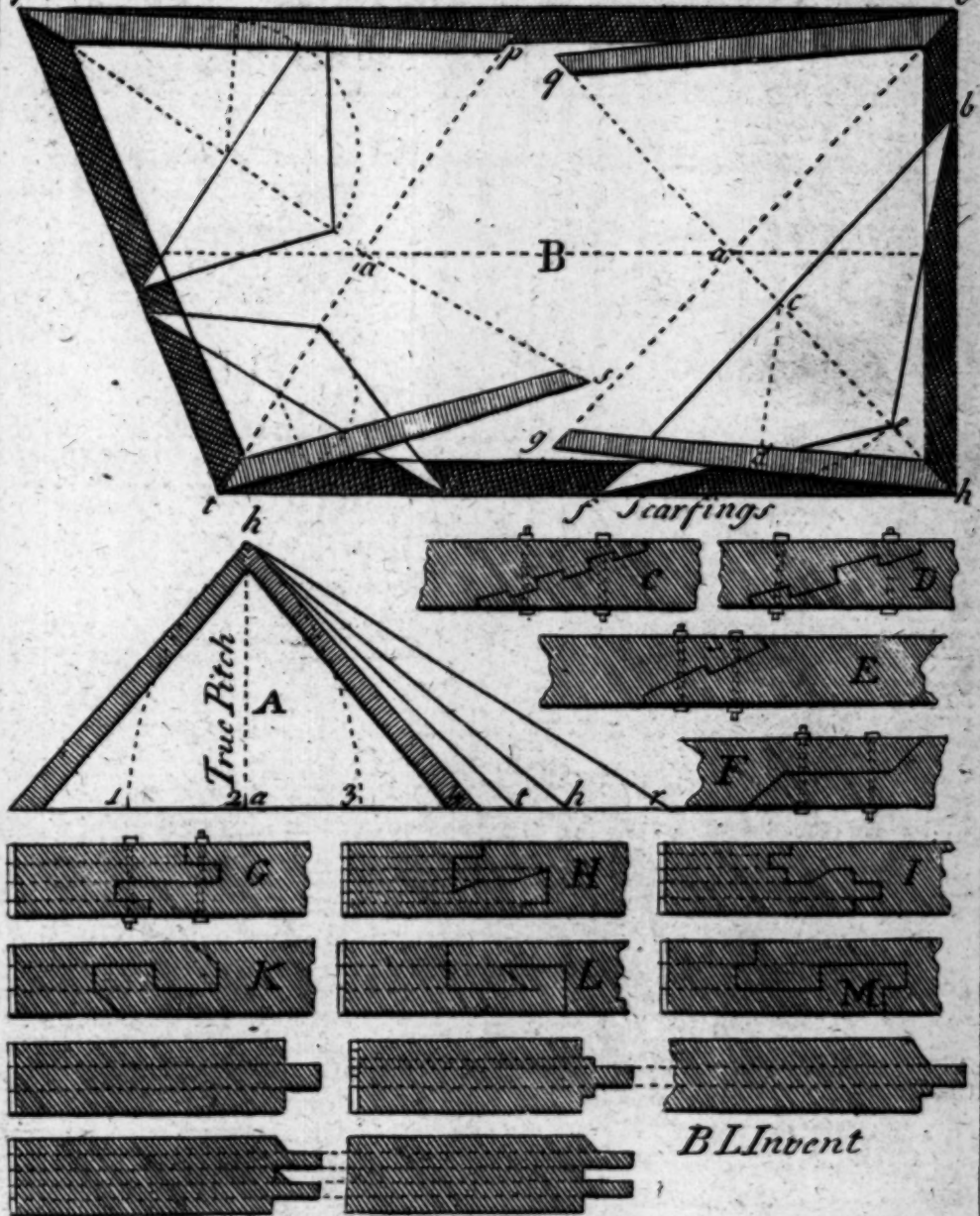
Length 24 Feet

B

C

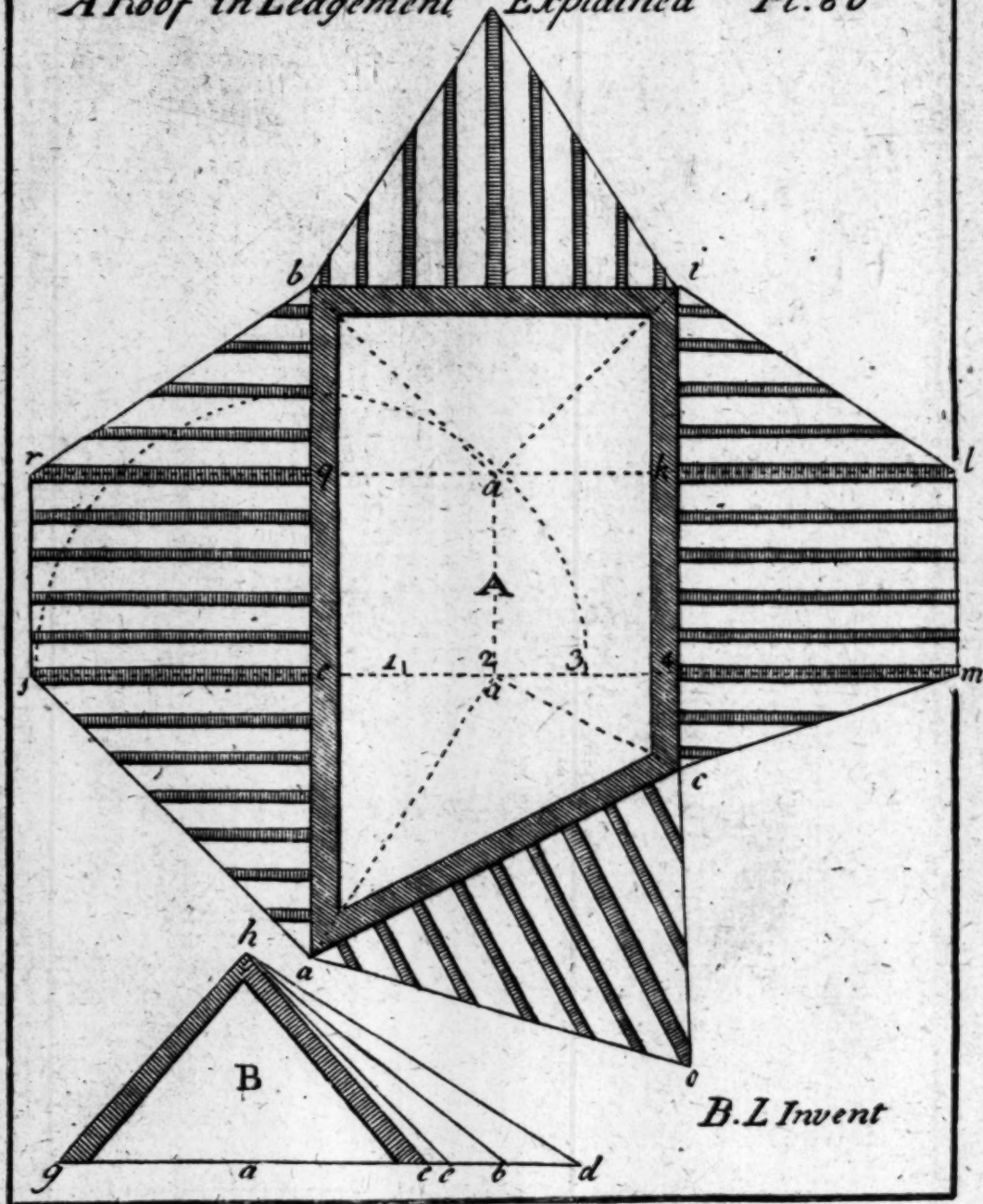
B. Langley Inv.

The Lengths & Backs of Hip Rasters Explained Pl. 85 v



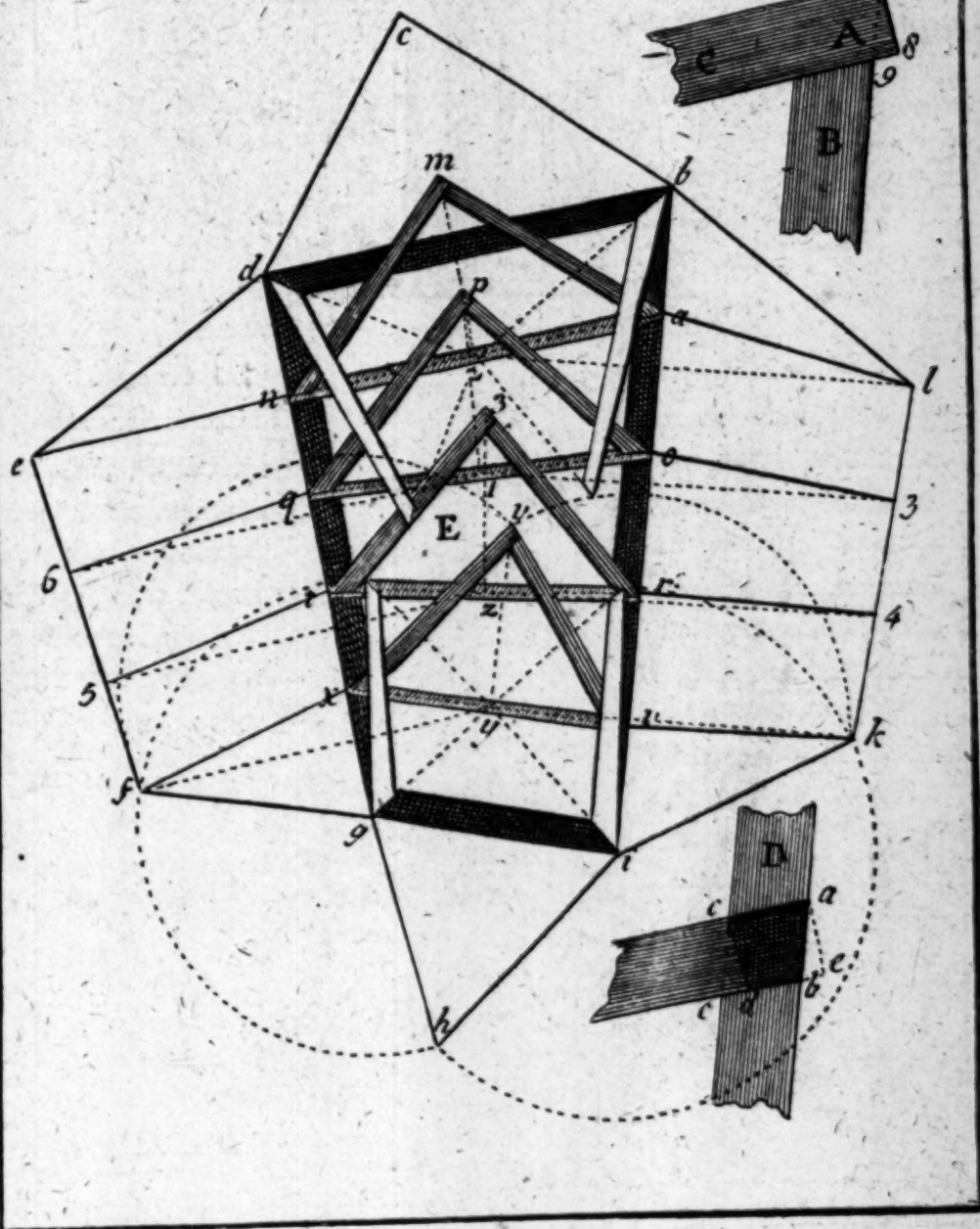
Ff.

A Roof in Ledge ment Explained Pl. 86



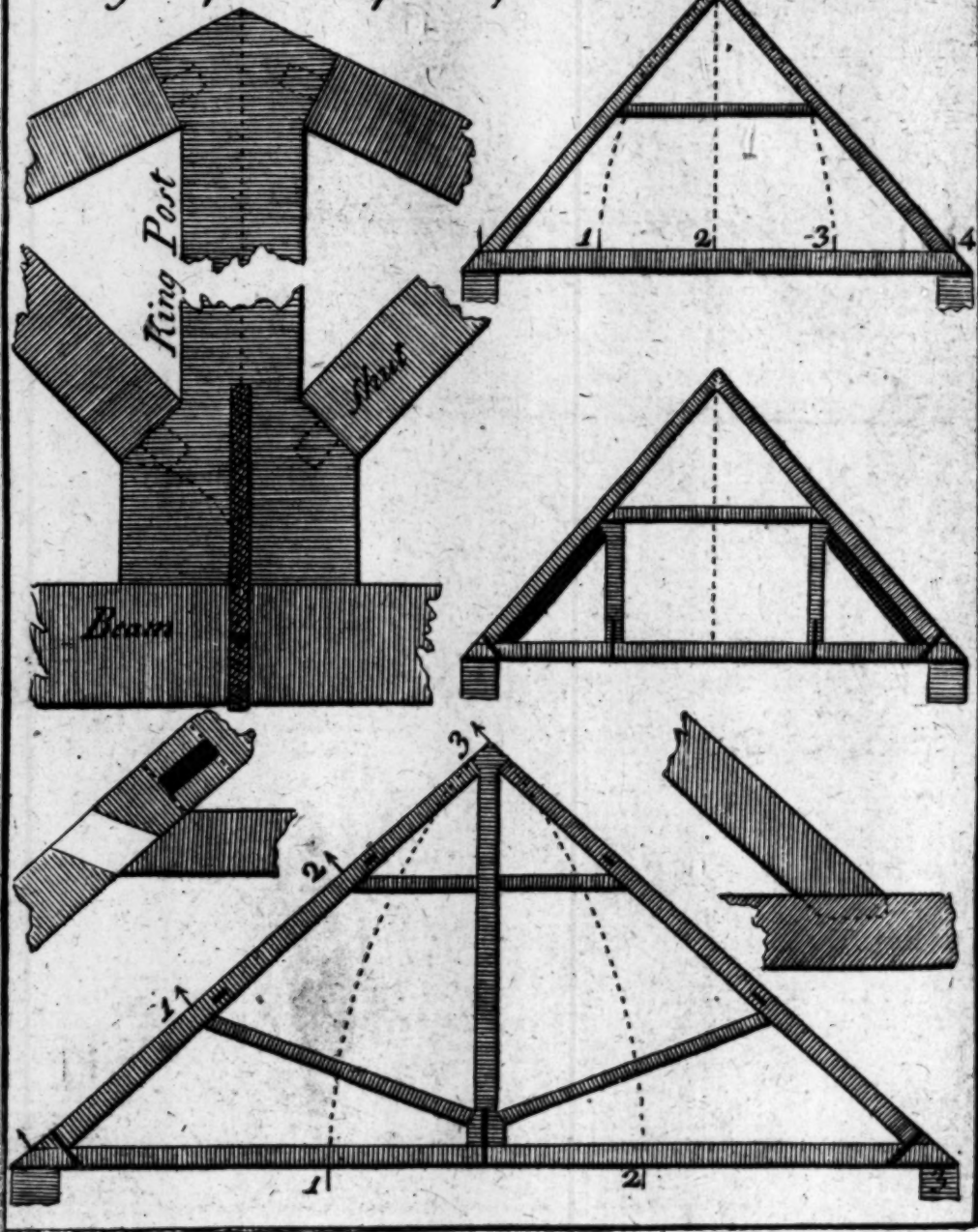
An Irregular Roof Explain'd

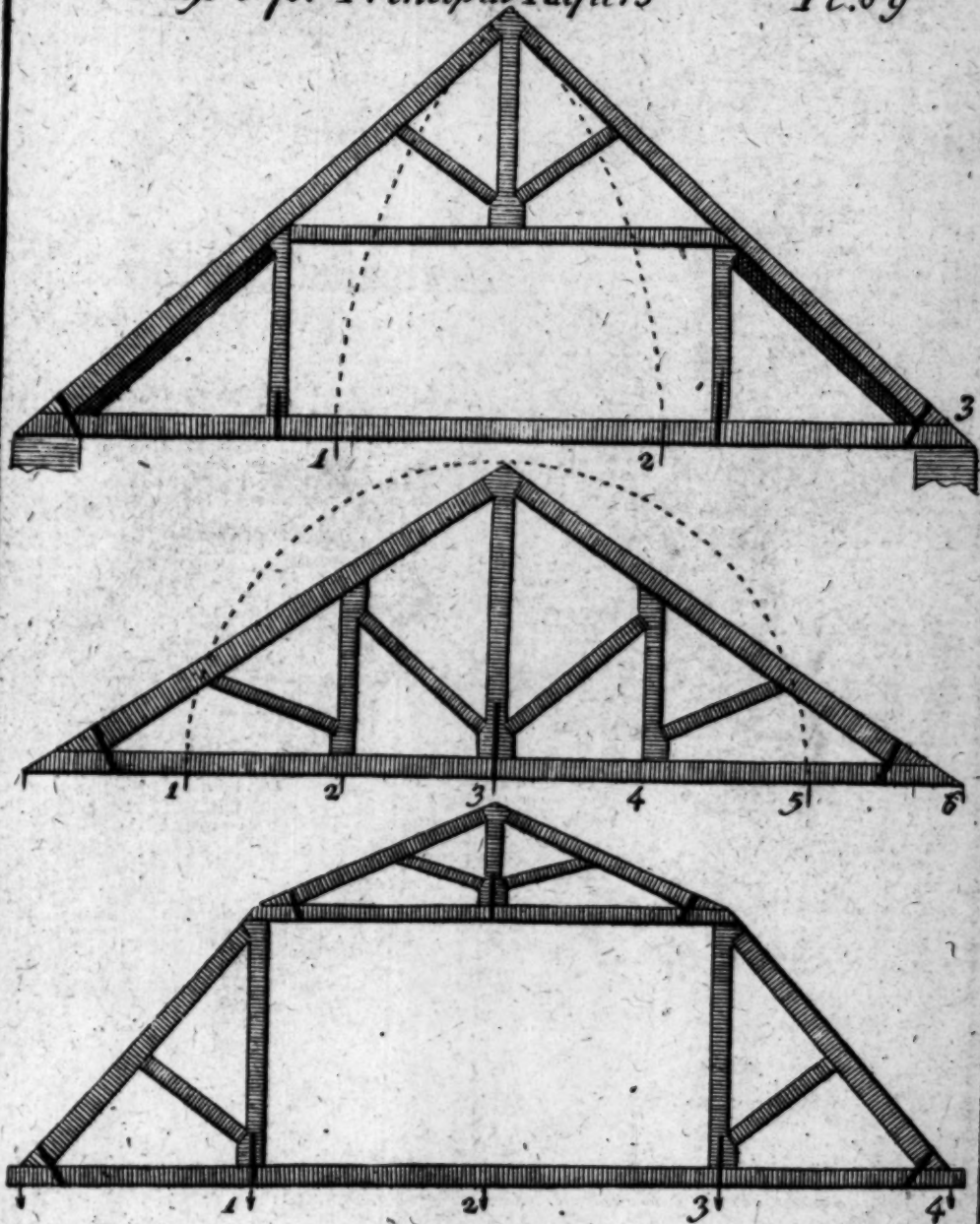
Pl 87



Trusses for Principal Rafter

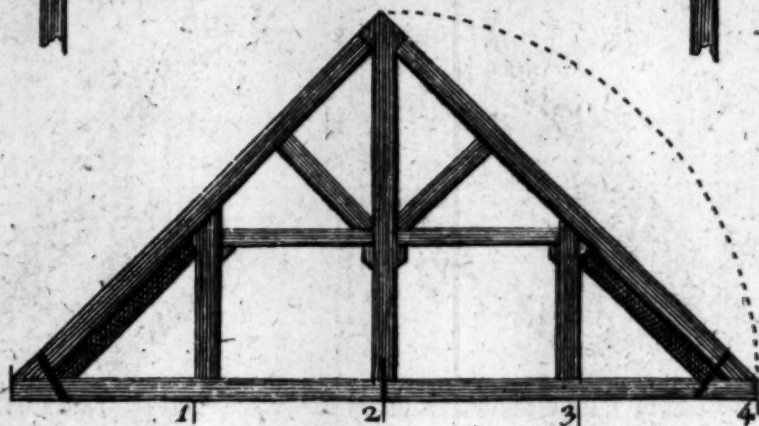
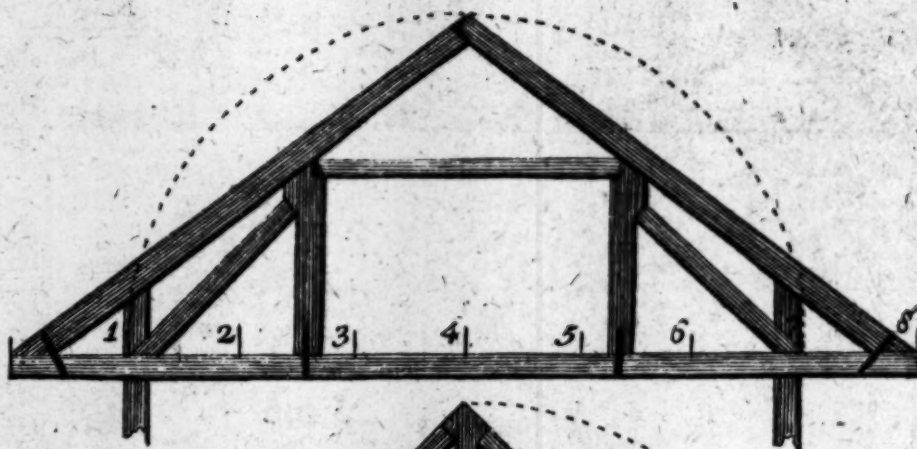
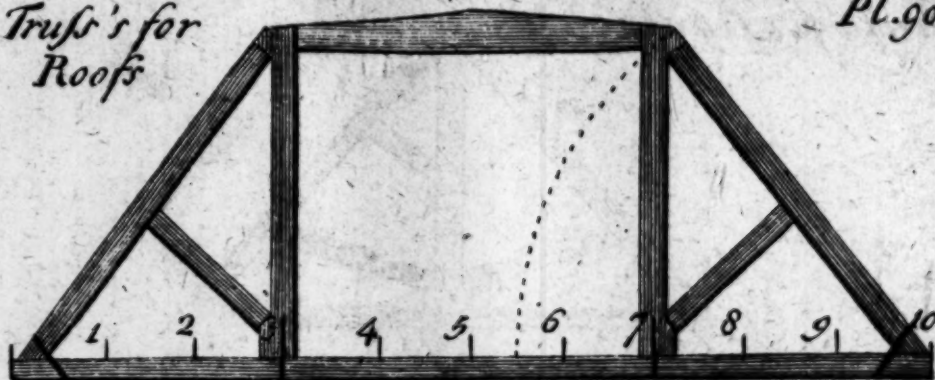
Pl. 88

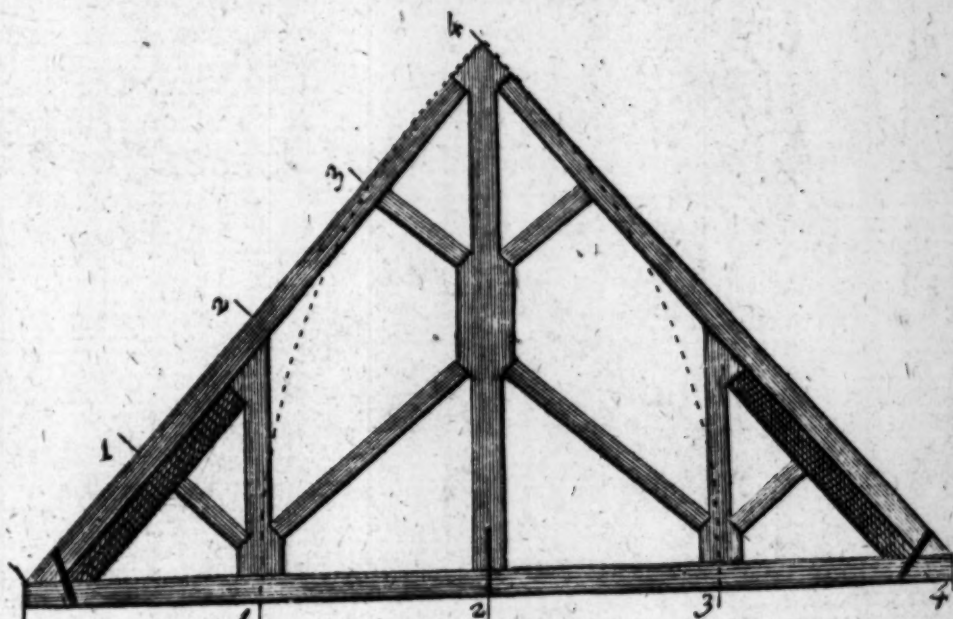
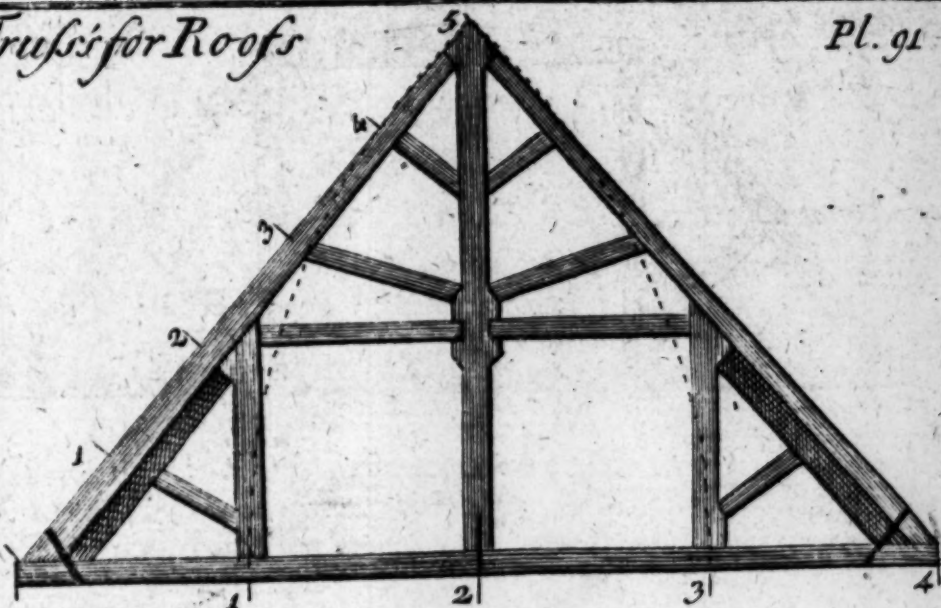




*Truss's for
Roofs*

Pl. 90



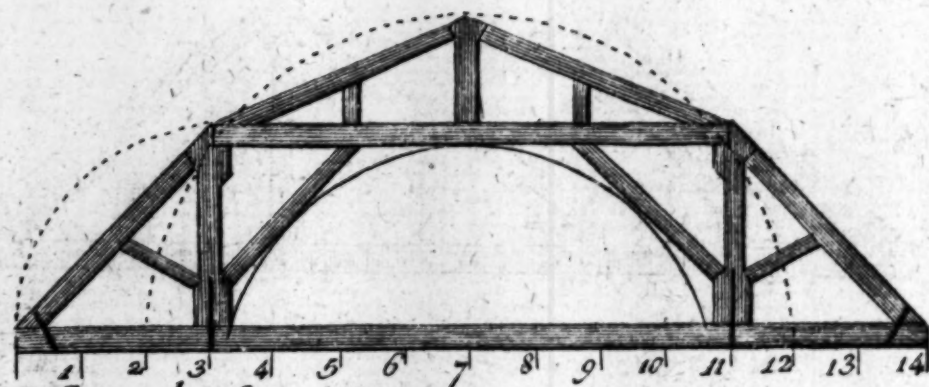
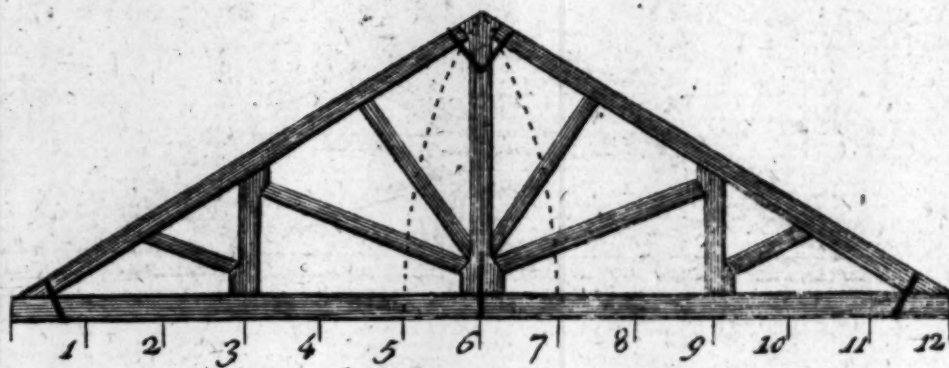
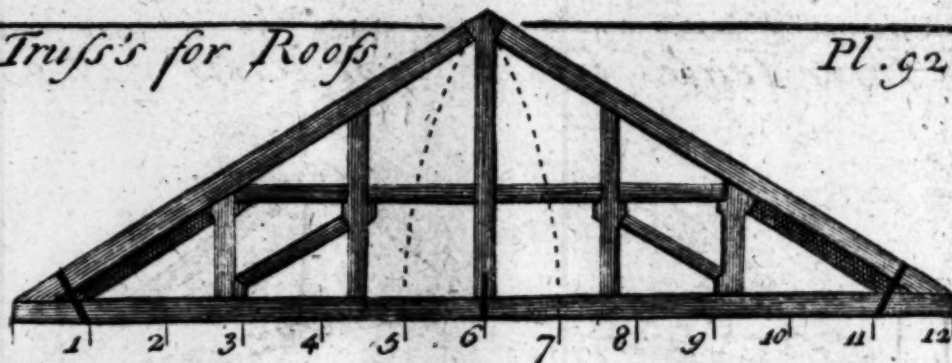


B. Langley Invent

Hh

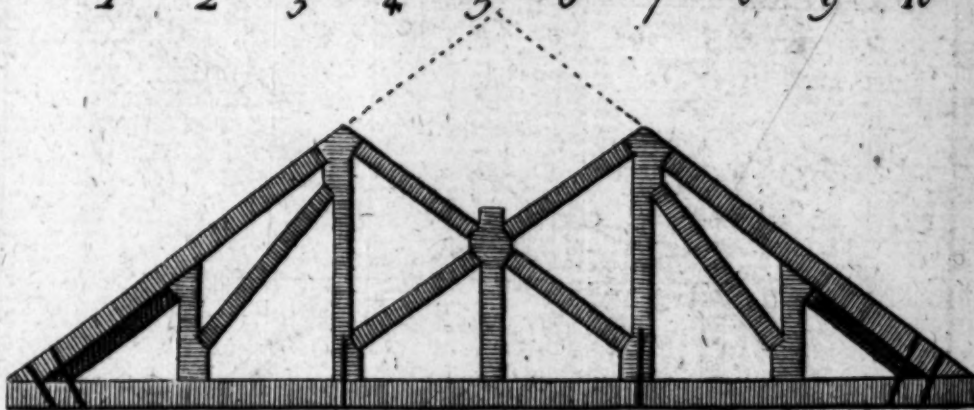
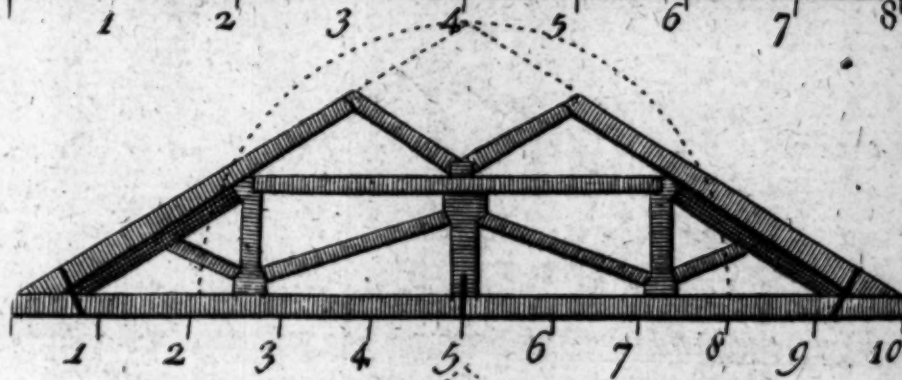
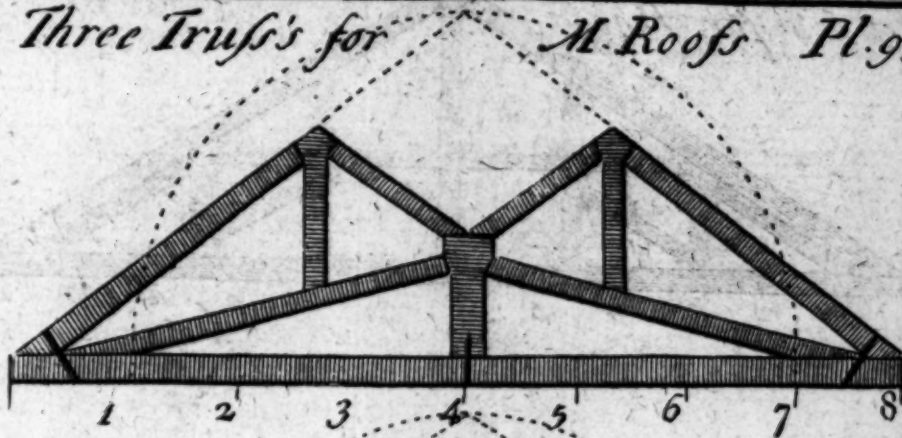
Truss's for Roofs

Pl. 92

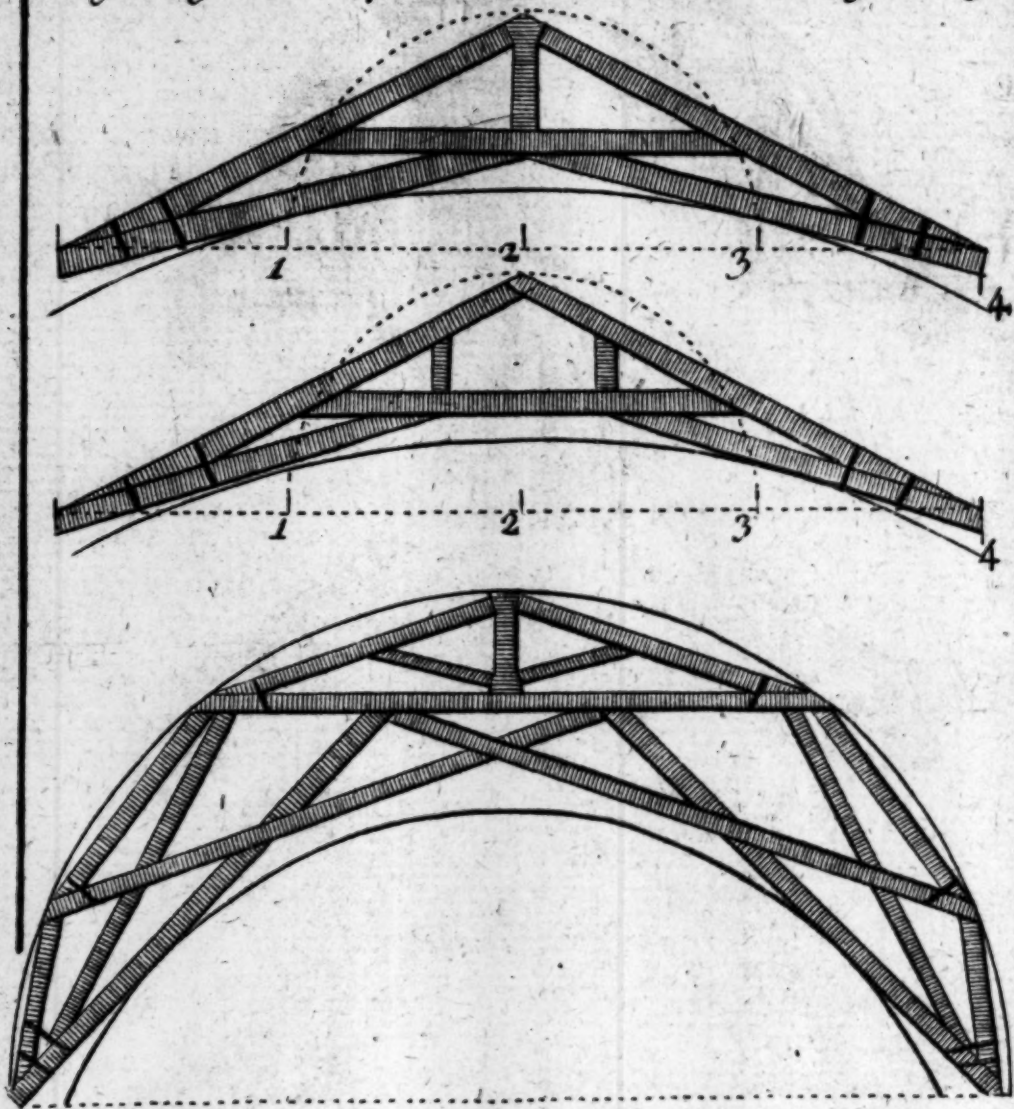


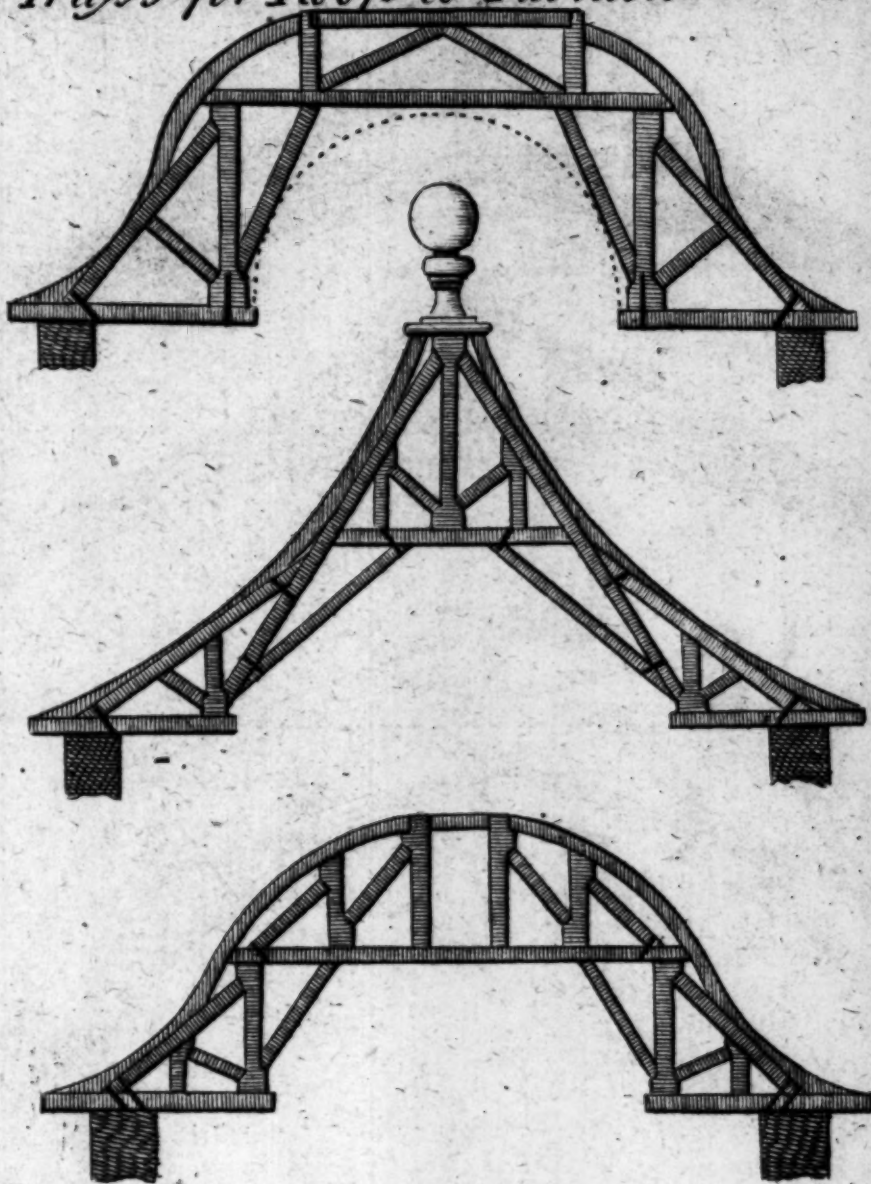
B Langley Invent

Three Truss's for M. Roofs Pl. 93



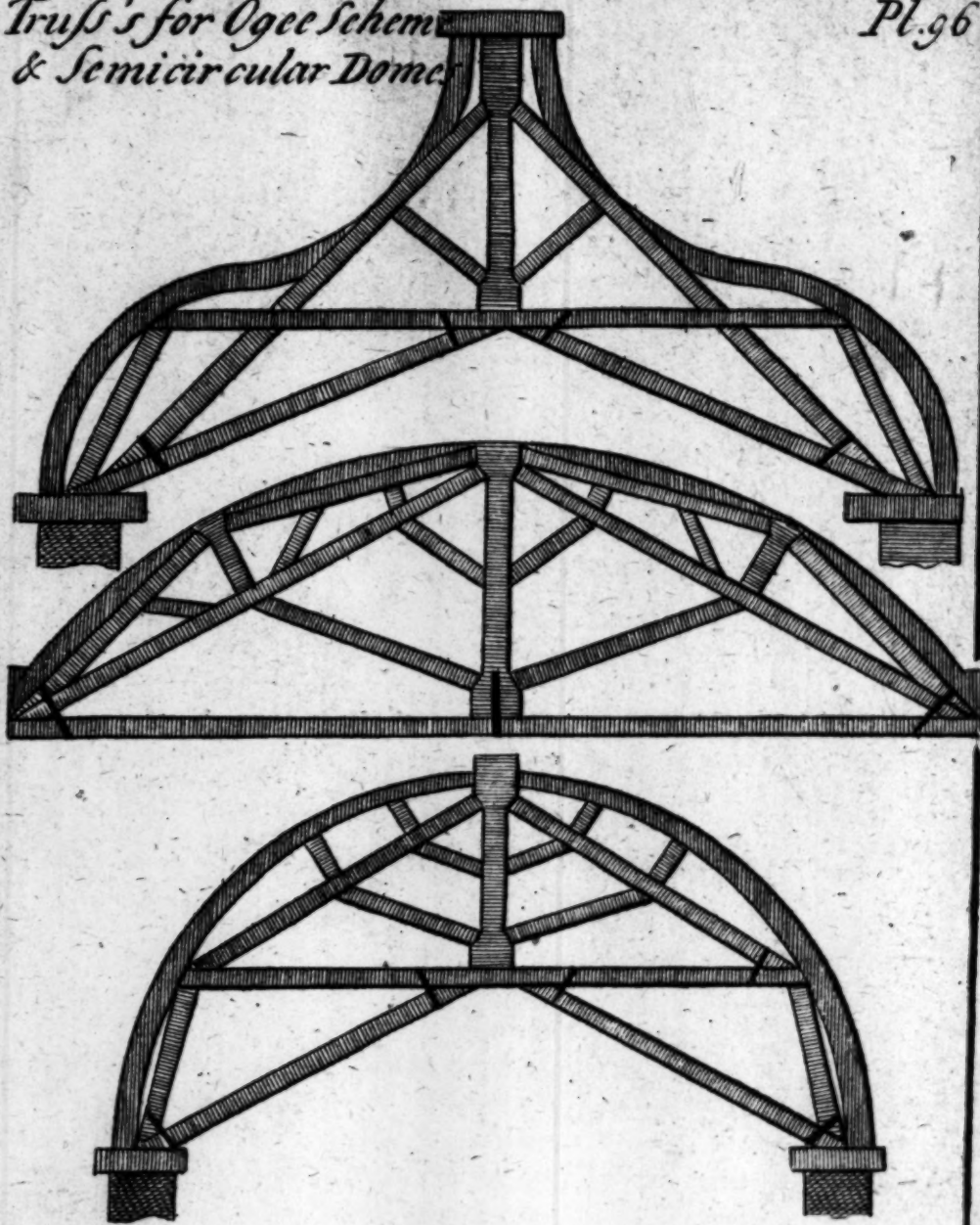
Truss's for Roofs over arch'd Ciellings Plg 4





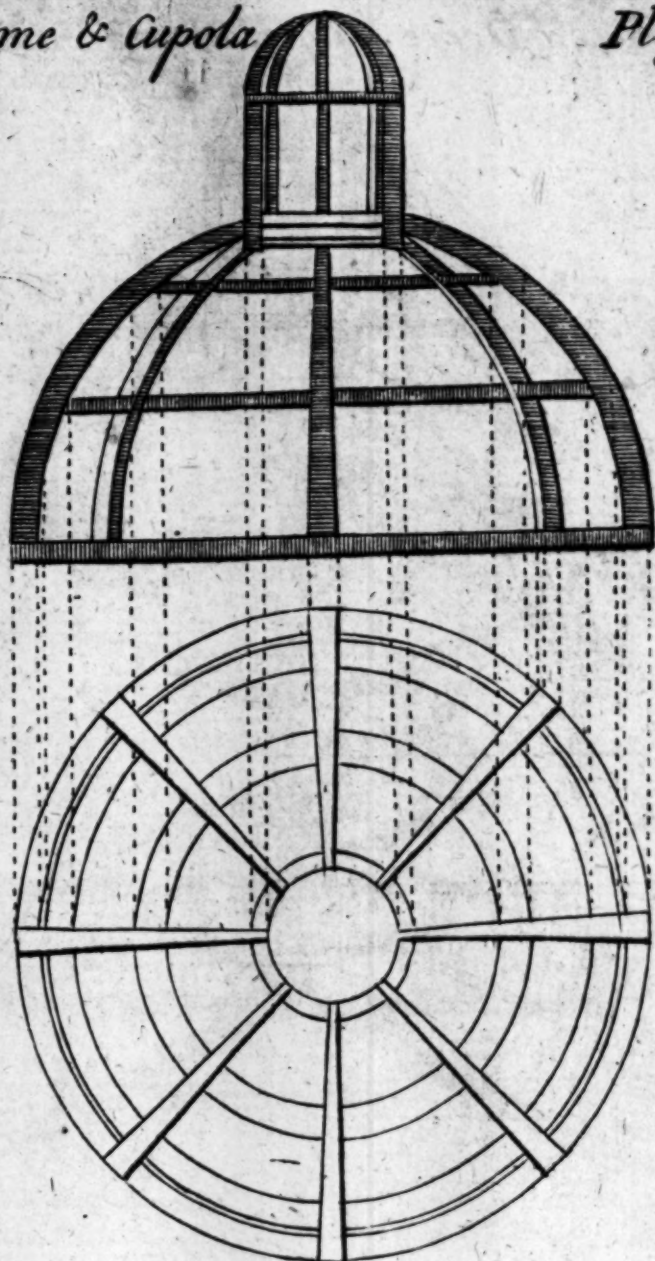
*Truss's for Ogee Scheme
& Semicircular Dome*

Pl. 96

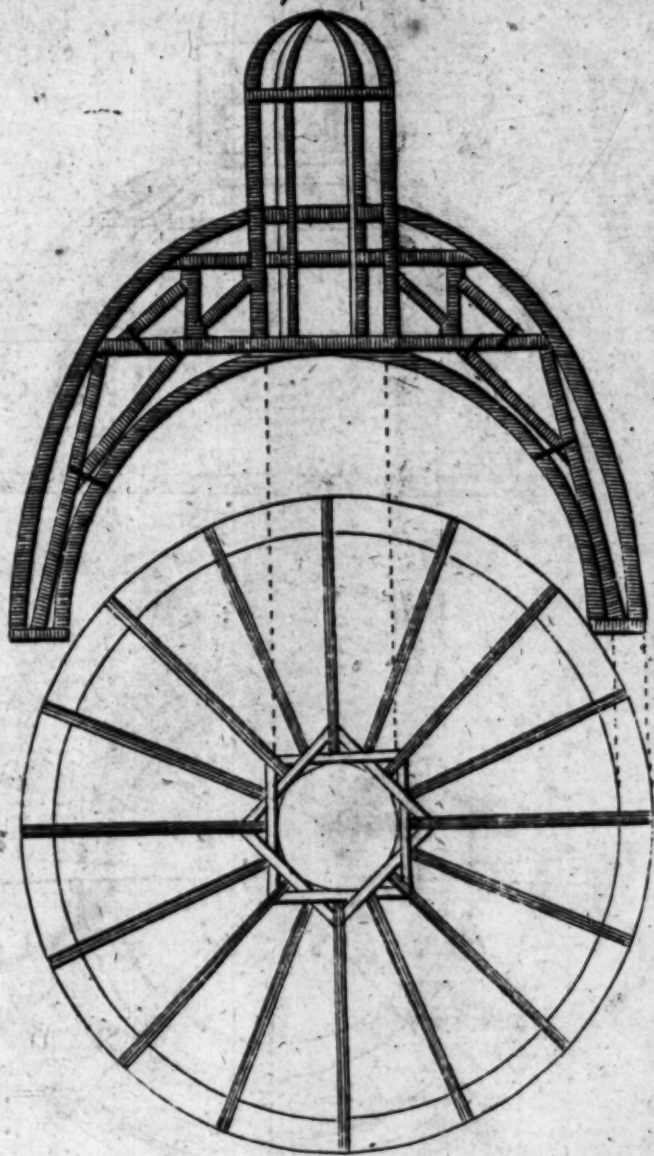


ARib'd Dome & Cupola

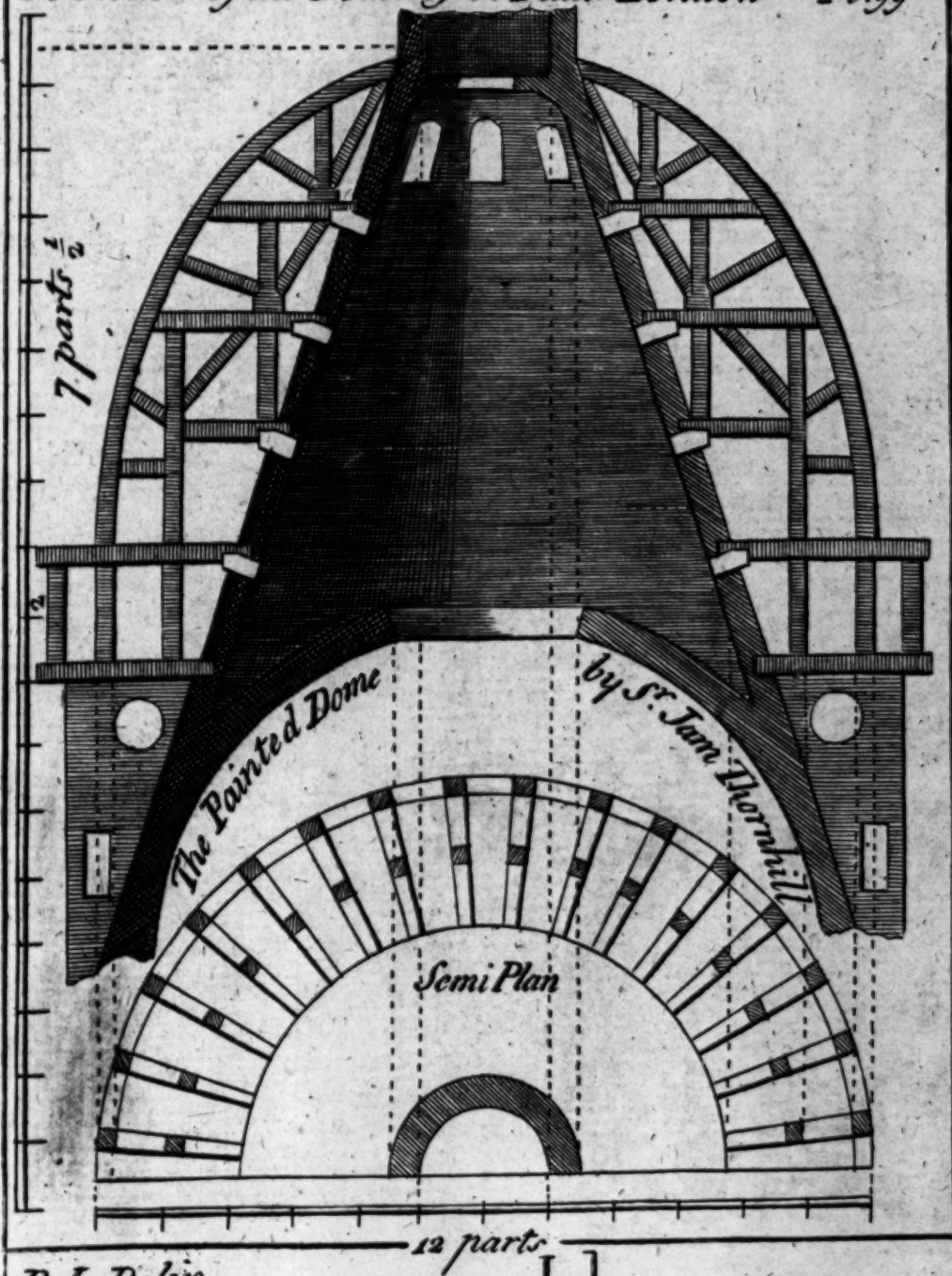
Pl. 97



Kk



A Section of the Dome of S^t Pauls London Pl. 99



B.L. Delin.

L1

B^QL

